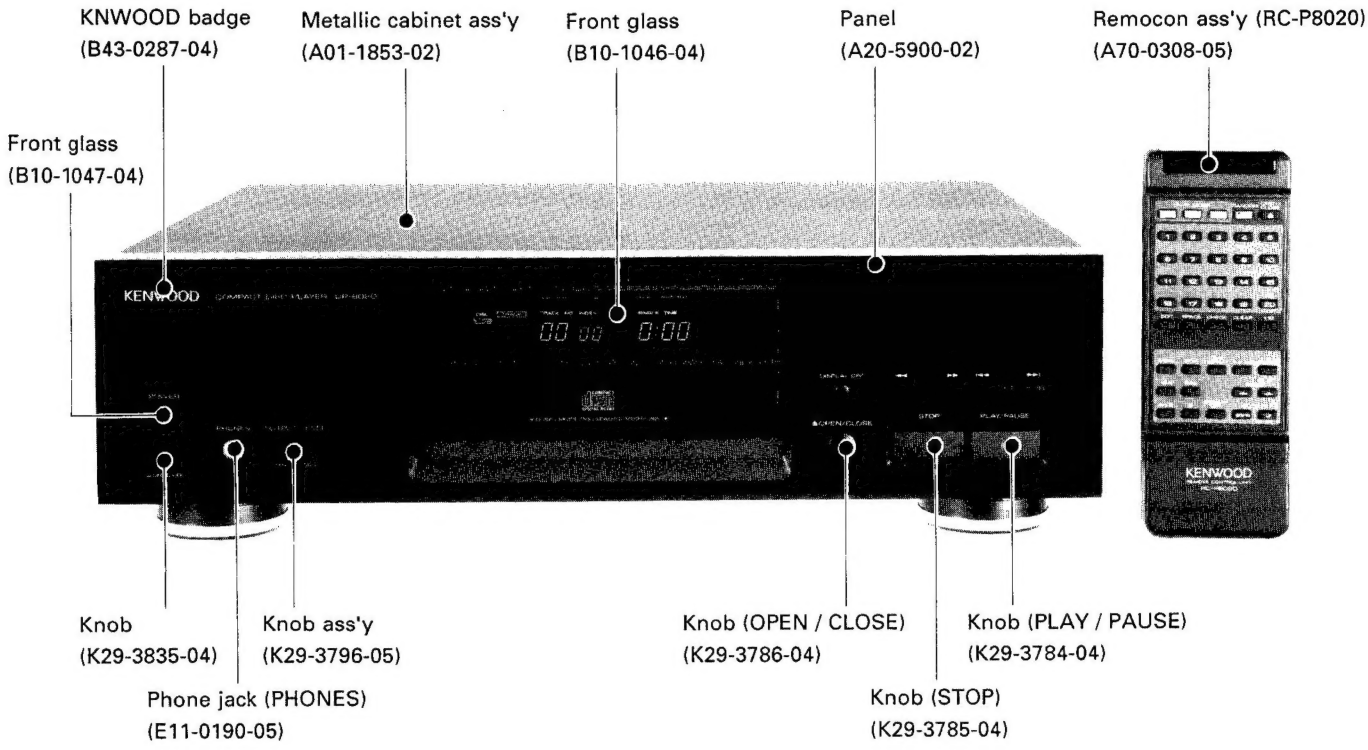
COMPACT DISC PLAYER

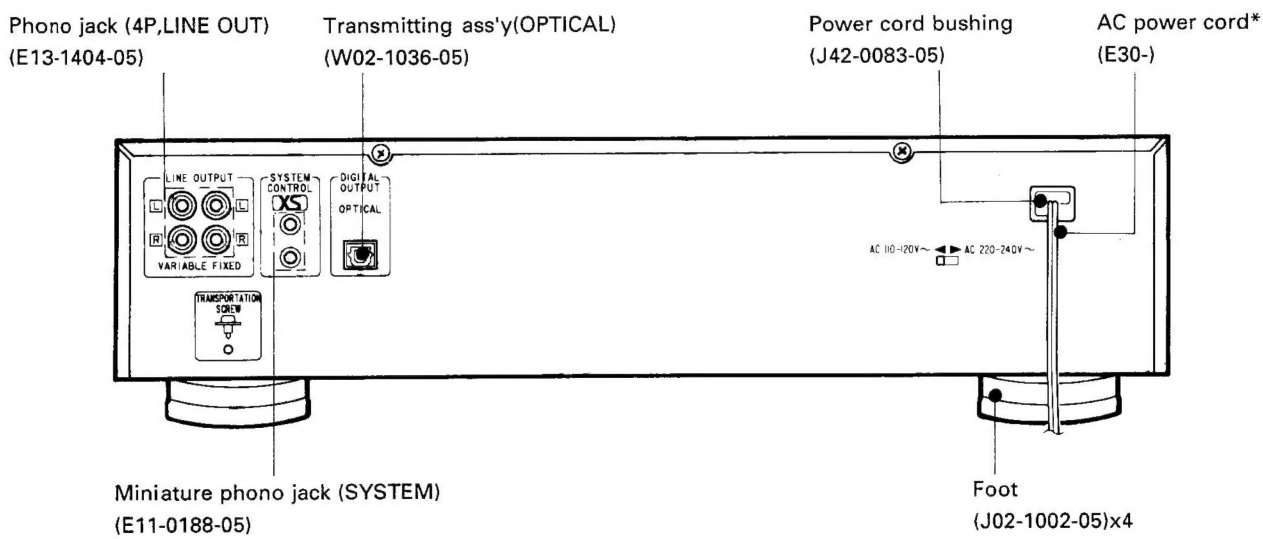
DP-8020

SERVICE MANUAL

KENWOOD

B51-3991-00 (O) 3223





In complicance with Federal Regulations, following are reproductions of labels on, or inside the product relating to laser product safety.

KENWOOD-Corp. certifies this equipment conforms to DHHS Regulations No. 21 CFR 1040. 10, Chapter 1, Subchapter J.

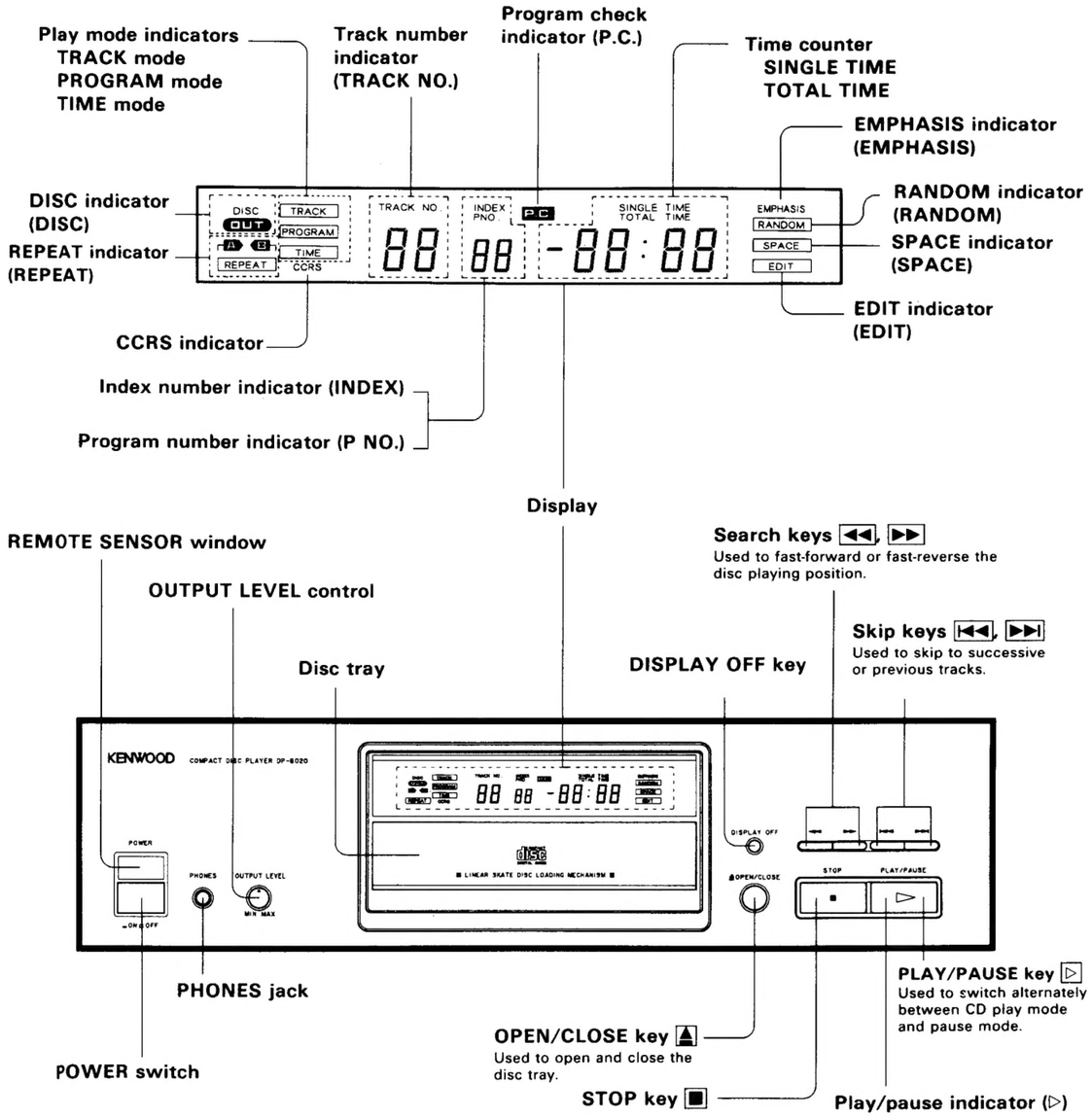
DANGER : Laser radiation when open and interlock defeated. AVOID DIRECT EXPOSURE TO BEAM.

*** Refer to parts list on page 72.**

DP-8020

CONTENTS

CONTROLS AND INDICATORS



DISPLAY OFF key

If the DISPLAY OFF key is pressed during disc play, the display is extinguished.

- If the DISPLAY OFF key is pressed at any time other than during disc play, the display will not be extinguished.
- When an operation key is pressed (excluding adjustment of the OUTPUT LEVEL control) while the display is in the DISPLAY OFF state, the display appears for a few seconds.
- When the display is in the DISPLAY OFF state during program play, the display appears for approximately 2 seconds at the beginning of each tune.

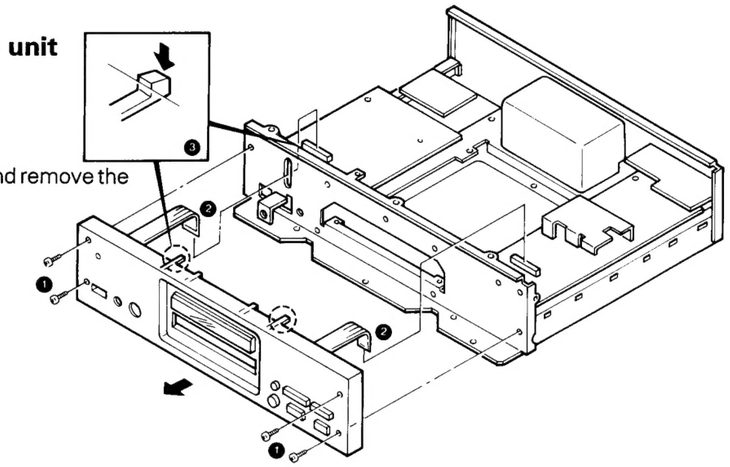
The DISPLAY OFF state is canceled when the DISPLAY OFF key is pressed again or when the OPEN/CLOSE key ⏏ or STOP key ■ is pressed.

DP-8020

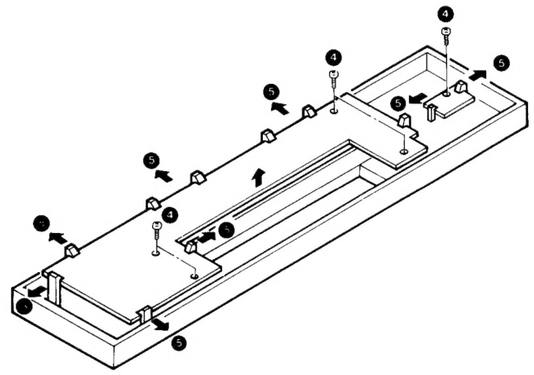
DISASSEMBLY FOR REPAIR

1. How to remove the operation unit

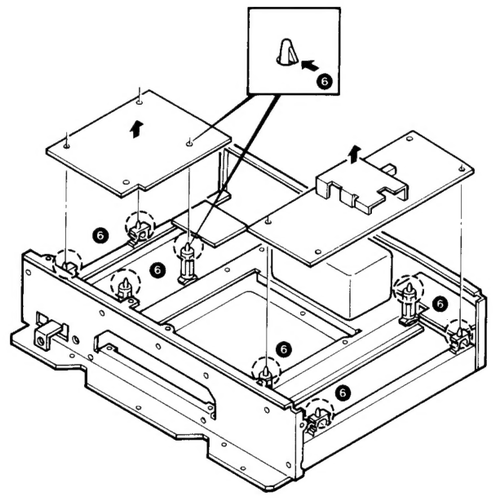
1. Remove the 4 screws (❶).
2. Pull out the 2 flexible Cables (❷).
3. Push the projection of the front panel and remove the panel (❸).



4. Remove 5 screws (❹).
5. Slide the projections and remove pc board ass'y (❺).

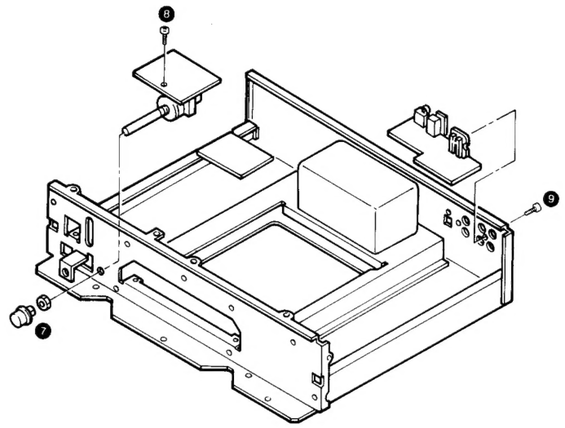


6. Push the projection of pcb holder (❻) and remove pc board ass'y.



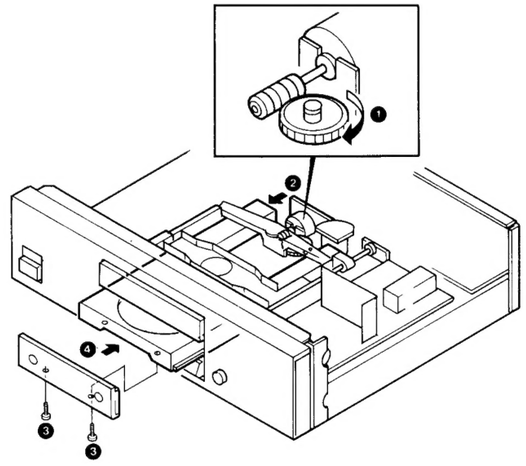
DISASSEMBLY FOR REPAIR

7. Remove the nut and knob (❼).
8. Remove the screw (❽) and volume control pc board ass'y.
9. Remove the screw (❾) and output pc board ass'y.

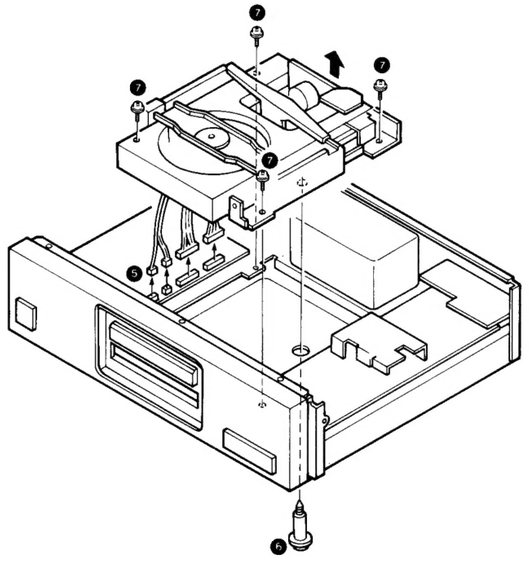


2. How to remove mechanism ass'y

1. Turn the gear of clamp-motor to clockwise by hand (❶).
2. Push the left back of the tray (❷).
3. Remove the 2 screws (❸) and the dressing panel.
4. Set the tray to closed position (❹).



5. Remove 4 connectors (❺).
6. Remove shipment safety screw (❻).
7. Remove 4 screws (❼) and mechanism ass'y.



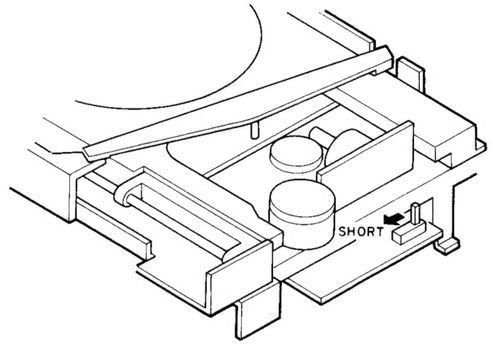
DP-8020

DISASSEMBLY FOR REPAIR

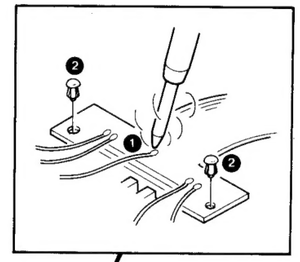
3.How to replace laser pickup

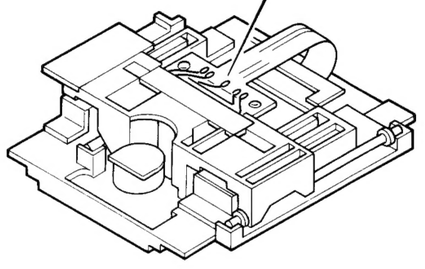
1. When checking or removing the laser pickup,first set the slide switch to SHORT position on mechanism pc-board.

Note: If repair finished, reset the slide switch to original position.



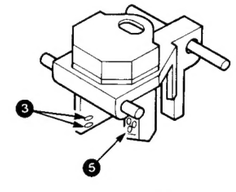
2. Pull out the tray (refer to how to remove mechanism ass'y.)
3. Unsolder the 5 leads from (❶) bottom of mechanism (blue : 2, red : 2, black : 1, total : 5) and remove push rivets (❷).

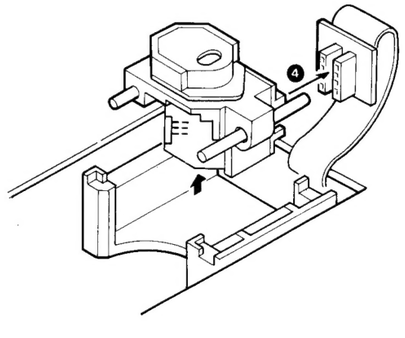




4. Remove 4 screws in order (refer to next page).
5. lift up the pick up and solder the short land (❸) and next pull out connector (❹).
6. When replace the pickup, first set the connector (❹) and the unsolder the solder bridge on the short land

Note: Don't touch the part of laser diode of pickup when handling it (❺). Don't screw tightly the pickup mounting screws when mounting it. Because the screw bent and the pickup don't fixed proper position.

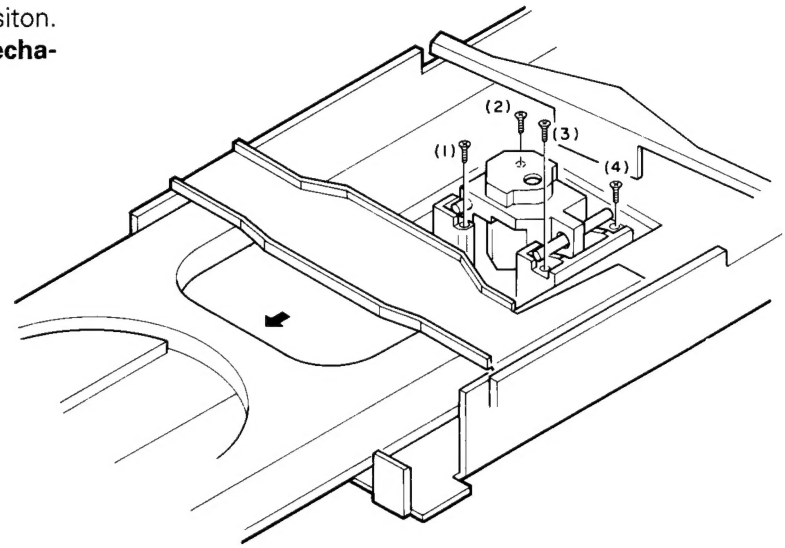




DISASSEMBLY FOR REPAIR

7. Solder5 leads and fix the push rivet to original positon.

Note: Check the slide switch position when mechanism ass'y mounted.



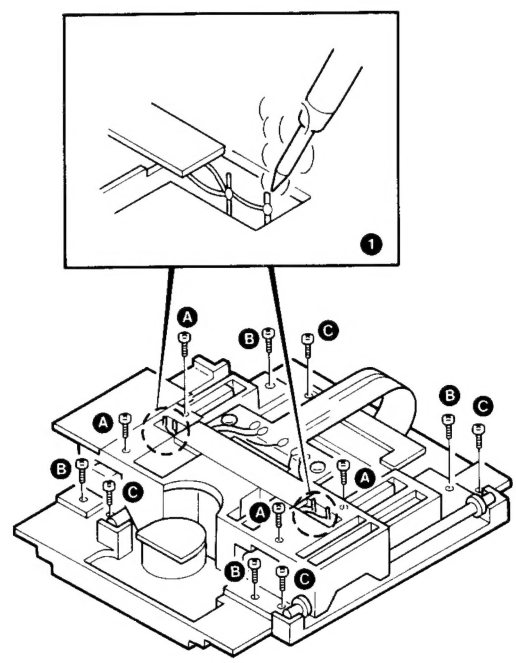
4. How to replace yoke ass'y

1. 4 leads conncted to yoke ass'y (❶)
   (red : 2, blue : 2, total : 4)

Note: If any pin of yoke ass'y is heated for an period of time or is subject to the application of an excessive force, it may be broken or come off.

2. Remove the four screws(Ⓑ) fixing the laser pickup holder and yoke assi'es.
3. Remove the four screws (Ⓒ) at the sensor section yoke ass'y and drive section yoke ass'y.

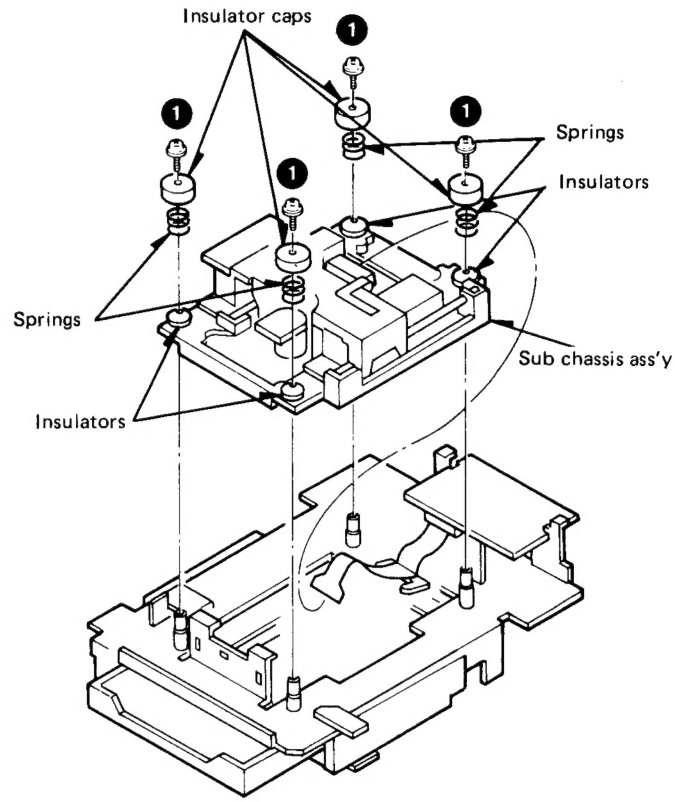
Note: In each yoke ass'y a coil magnet is incorporated. If disassembled, a load can be applied in the sliding action or unwanted matter (screw, lead cutting dusts, etc.) can adhere to the magnet. Moreover, after completion of repair, also check whether or not unwanted matters such as screw, lead cutting dusts, etc. adh ere to the magnet.



DISASSEMBLY FOR REPAIR

5. Removing the sub chassis and the insulators

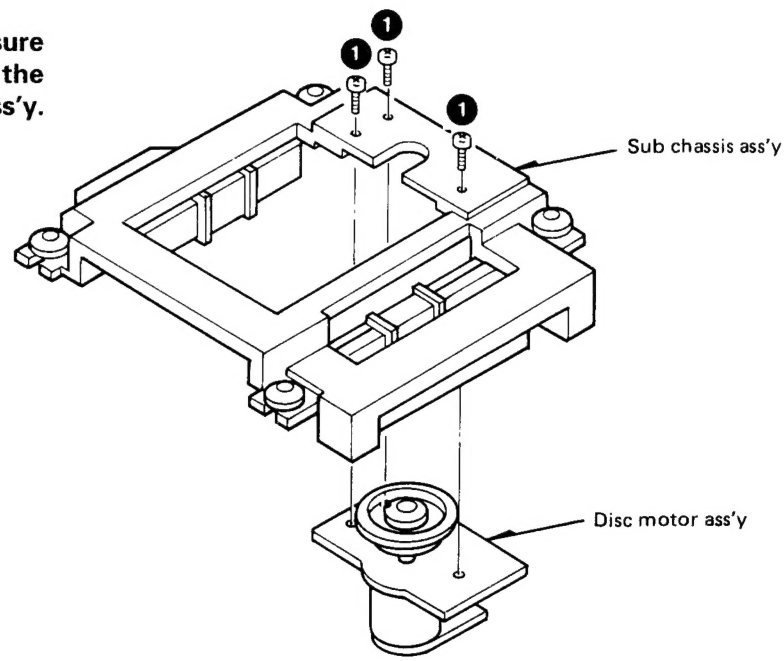
1. As shown on the right, remove the four tapping screws (❶), and the laser pickup section will be detached together with the sub chassis ass'y to which it is installed.



6. Replacing the disc motor

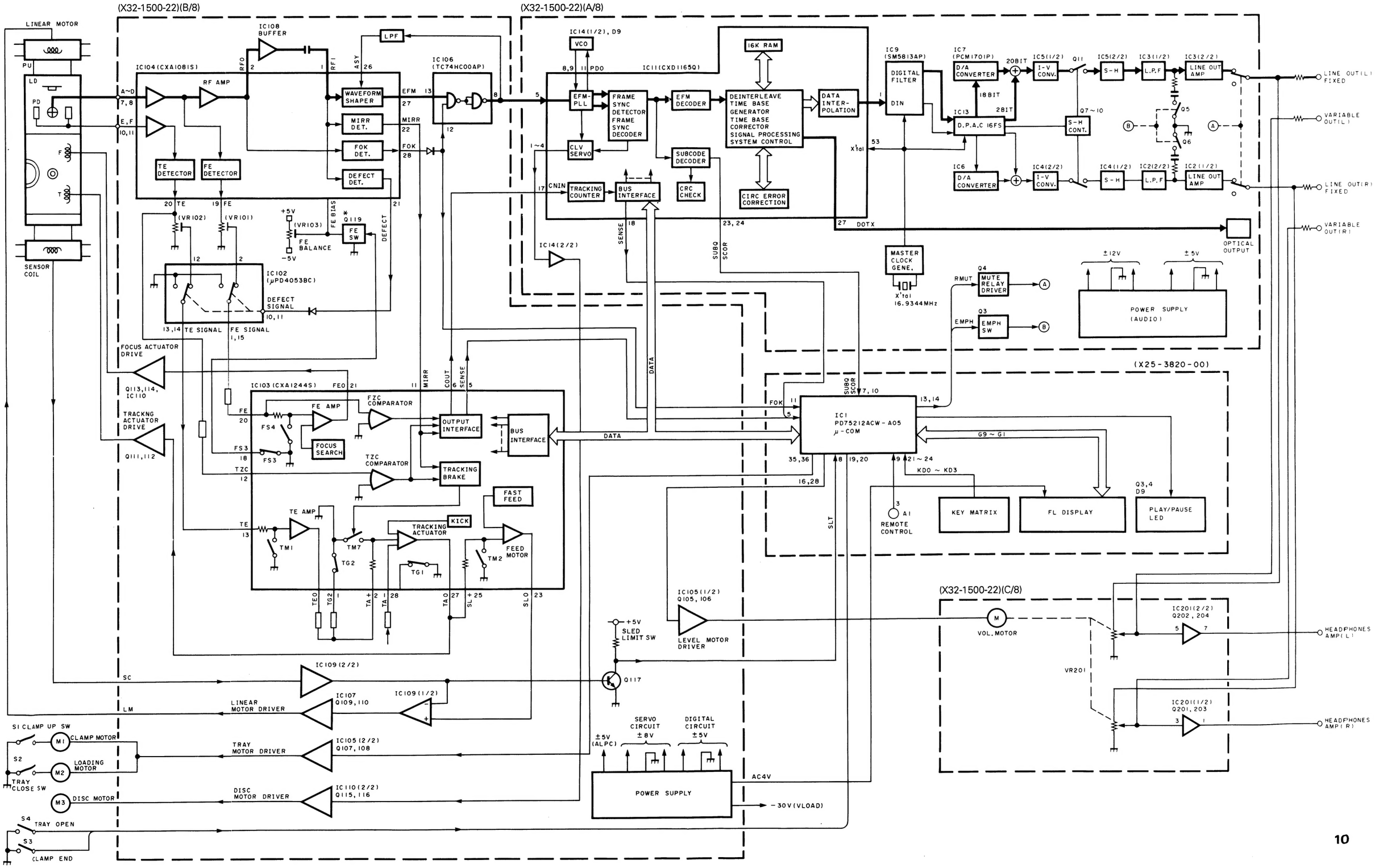
1. Remove the three screws (❶) fixing the sub chassis ass'y, then replace the disc motor ass'y.

Note: When installing the new disc motor, be sure to positively mount it in alignment with the two grooved portions of the sub chassis ass'y.



DP-8020 DP-8020

BLOCK DIAGRAM



CIRCUIT DESCRIPTION

1. Description of components

1-1. CD PLAYER UNIT (X32-1500- 22)

Ref. No.	Part. No.	Use/Function	Operation/Condition/Compatibility
IC1	NJM4565D	Power Supply	For analog circuit of DAC.
IC2, 3	NJM4565D	L.P.F	2nd low pass filter and amplifier for output.
IC4, 5	NJM4580D	I - V Converter	Conversion of D/A converter current output into voltage from. (Refer to D.P.A.C at page 14)
IC6, 7	PCM1701P	DAC	Conversion of 18bit digital data into analog one.
IC8	NJM4565D	Power supply (+5V)	For oscillation (IC10), Digital filter (IC9) and HIC.
IC9	SM5813AP	Digital filter	Convert 16bit FS to 20bit 8FS.
IC10	TC74HCU04AP	Oscillation	Oscillation master clock 16.9344MHz and applied clock signal to IC9,11, and 13.
IC11	CXD1165Q	Digital signal processor	All digital signal processing operation, Including the EFM data demodulator, error correction, interpolation circuit, PLL, CLV, Digital output jitter free.
IC12	NJM4565D	Power supply (+5v)	For IC11,15 and IC14 of PLL and CLV.
IC13	KAG01	Bit converter	Add 2bit to 18bit DAC and 18bit to 20bit jitter free. (refer to circuit descrip tion at page 39)
IC14	NJM4565D	PLL, CLV servo	Servo amplifier for disk motor and control VCO freq. by phase comparation signal.
IC15	TC74HC00AP	Data select	No use for repair.
IC101	NJM4558D	Power supply (+5V)	For servo circuit.
IC102	µPD4053BC	Defect circuit	If RF signal defect (IC104 Defection), servo circuit is open and playback goes on.
IC103	CXA1244S	Servo signal processor	Control of focusing error tracking servo and feed servo pulses for servo control.
IC104	CXA1081S	RF amplifier	Focusing error signal generator, tracking error signal generator, RF signal generator and phase compensation.
IC105	NJM4558D	Motor control	For motor of OPEN/CLOSE and one of UP/DOWN.
IC106	TC74HC00AP	Buffer amplifier	For EFM signal to signal processor.
IC109	NJM4558D	Amplifier	For sled drive of pickup travel.
IC110	NJM4558D	Amplifier	For focus actuator drive and disk motor.
IC201	NJM4565D	Amplifier	For headphone.
Q1	2SB941	Power supply (+)	For analog circuit.
Q2	2SD1266	Power supply (–)	For analog circuit.
Q3	DTC124EN	Inter face	For emphasis and micro processor.
Q4	2SC1740S	Inter face	For relay, micro processor and relay drive.
Q5, 6	2SC2878	Switch	For emphasis.
Q7, 8	2SA1206	Inter face	For sample-hold circuit and inter face of clock signal.
Q9, 10	2SK246	Power supply	When Q7, 8 are off condition, Q11, 12 are off.
Q11, 12	2SK152	Switch	Control the gate Q7~10. If on, sample mode. If off, hold mode.
Q13, 14	2SC3940A	Power supply (+5)	For DAC.
Q15	2SC3940A	Power supply (+5)	For digital filter (IC9).
Q16	2SC3940A	Power supply (+5V)	For oscillation (IC10).
Q17	2SA1534A	Power supply (–5V)	For PLL and CLV.
Q18	2SC3940A	Power supply (+5V)	For PLL, CLV and signal processor.
Q19	2SK246	Power supply (+5V)	—
Q20 Q21	2SA933S 2SC733 (A)	Muting amplifier	Control output of optical when power on. Buffer amplifier for optical output.
Q101	2SA1534A	Power supply (+5)	For servo circuit.
Q102	2SC3940A	Power supply (–5V)	For servo circuit.
Q103	2SD1944	Power supply (+5V)	For FL-indicator.
Q104	2SA1534A	Power supply (–30V)	For FL-indicator.
Q105 Q106	2SA1534A 2SC3940A	Buffer	Drive motor of VOLUME.
Q107 Q108	2SA1534A 2SC3940A	Buffer	Drive motor of tray.

DP-8020

CIRCUIT DESCRIPTION

Ref. No.	Part. No.	Use/Function	Operation/Condition/Compatibility
Q109	2SA1534A	Buffer	Drive feed motor.
Q110	2SC3940A		
Q111	2SA1534A	Buffer	Drive actuator of tracking.
Q112	2SC3940A		
Q113	2SA1534A	Buffer	Drive actuator of focusing.
Q114	2SC3940A		
Q115	2SA1534A	Buffer	Drive disk motor.
Q116	2SC3940A		
Q118	2SA11534A	Buffer	For laser diode and ALPC.
Q119	2SC1740S (Q, R) 2SC945 (A) (Q, R)	Switch	When focus servo is on FE BIAS circuit works.
Q201 Q202 Q203 Q204	2SC3666 2SA1426	Buffer	For head phone.

1-2. DISPLAY AND µ-COM UNIT (X25-3820-00)

Ref. No.	Part. No.	Use/Function	Operation/Condition/Compatibility
IC1	µPD75216ACW-295	Micro processor	(Refer to circuit description at page 22)
IC2	M51951ASL	Reset IC	For reset of micro processor.
Q1, 2	2SC1740S (Q, R) 2SC945 (A) (Q, R)	Buffer	For indicator of pin 1 and 9.
Q3, 4	DTA124EN	Buffer	For PAUSE LED.
Q5	DTA124EN	Buffer	For VOLUME LED.

CIRCUIT DESCRIPTION

2. CD player unit (X32-1500-22)

• Pickup carry circuit by linear motor

The speed sensor generates a voltage proportional to the moving speed of the pickup mount. More, since this voltage is yet low in level, it is amplified at IC109(1/2).

Therefore, the voltage at point Ⓐ becomes the signal standing for the moving speed of the pickup mount. This speed signal is inverted and amplified, and further the drive coil is driven so that the pickup amount is servo-controlled in respect to the moving speed.

The power OP amplifier of IC107(LA6500) is used to extend the dynamic range of driving the drive coil of the linear motor. The voltage at point Ⓑ serves as the moving speed reference of the pickup amount. In addition, the pickup amount moves at a speed proportional to the voltage at point Ⓑ.

Example: When the voltage at point Ⓑ is 0V, the pickup mount does not move, whereas when it is positive, the pickup mount moves inwards at a speed proportional to that voltage.

The voltage at point Ⓑ is the same as the voltage driving the pickup carry motor in a conventional mechanism and can be represented to a servo block diagram as shown in Figure 1. which manifests a direct feedback system.

Thus, if value $|A>$ is sufficiently large, Ⓐ = Ⓑ.

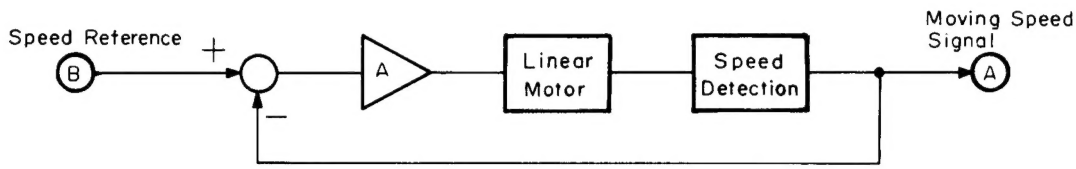


Fig. 1

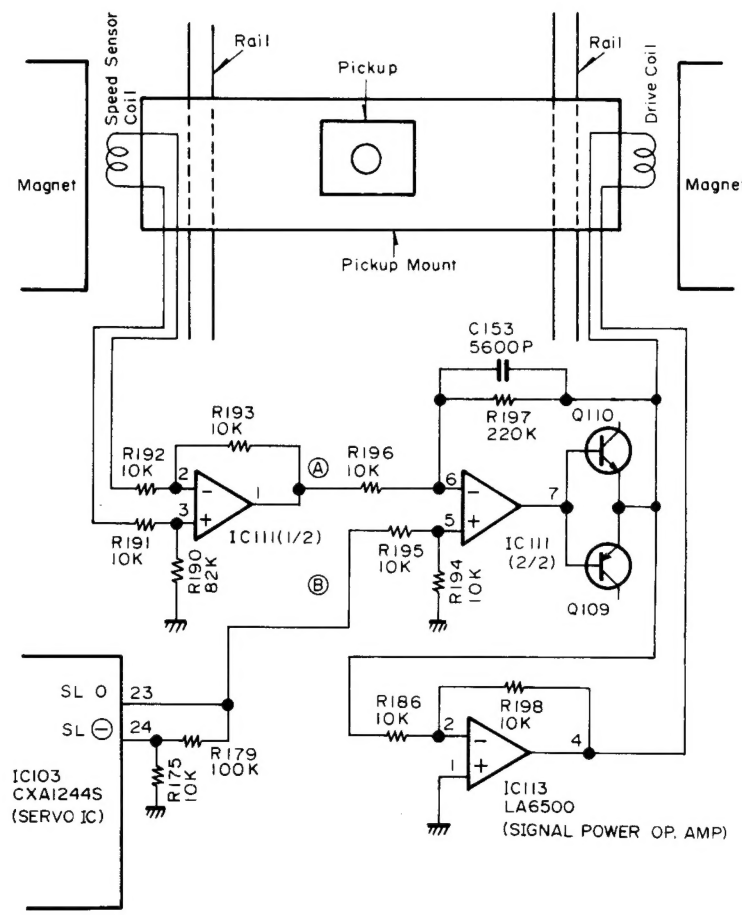


Fig. 2 **Pickup carry circuit by linear motor**

CIRCUIT DESCRIPTION

• D.P.A.C (Digital Pulse Axis Control) circuit

Two different distortions are attendant on the conversion of the digital signal into an analog signal. One is a distortion on the level axis (voltage axis), which is determined mainly by the resolution of the D/A converter, and in case of using a ladder resistor type, by its error.

The other is a distortion on the time axis, which is not so prevailing as to appear on the distortion meter but has great influence on the sound quality. It is the D.P.A.C that is to operate as a circuit to improve this point.

Figure 3 shows the error (distortion) on the voltage axis of the D/A converter output for the original sound, and Figure 4 shows the error (distortion) on the time axis of the D/A converter output for the original sound.

As seen from this, even with a variation in time axis, there appears a regenerated waveform different from the original sound.

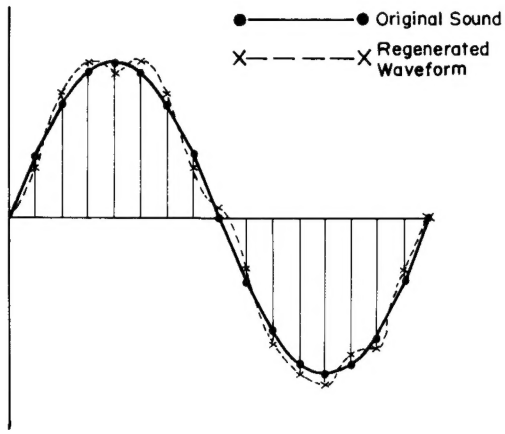


Fig. 3 Error (distortion) on voltage axis

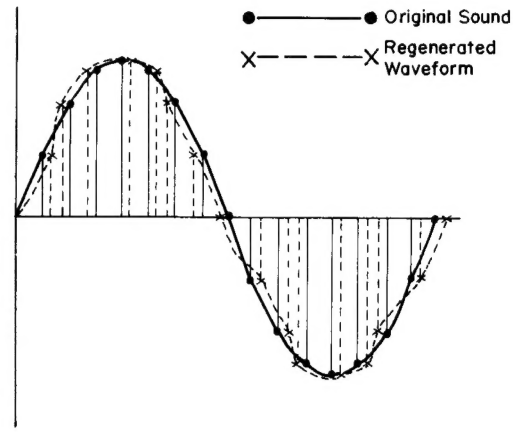


Fig. 4 Error (distortion) on time axis

• D.P.A.C by sample holding (S-H) circuit

The model of this time has the D.P.A.C circuit on the basis of an S-H circuit which has been more improved than the conventional D.P.A.C.

This new S-H circuit has the same composition as the conventional one. The difference between them is that the former uses the clock obtained by dividing the master clock for the sample holding signal which does not have jitters. This clock is converted into an analog signal, than its time axis corrected (its jitters are eliminated). The D/A conversion is carried out at 8 FS, but the sample holding clock is set to 16 FS. Accordingly , the noises generated in the S-H circuit is raised to 16 FS, thus the effects on the audio signal is minimized.

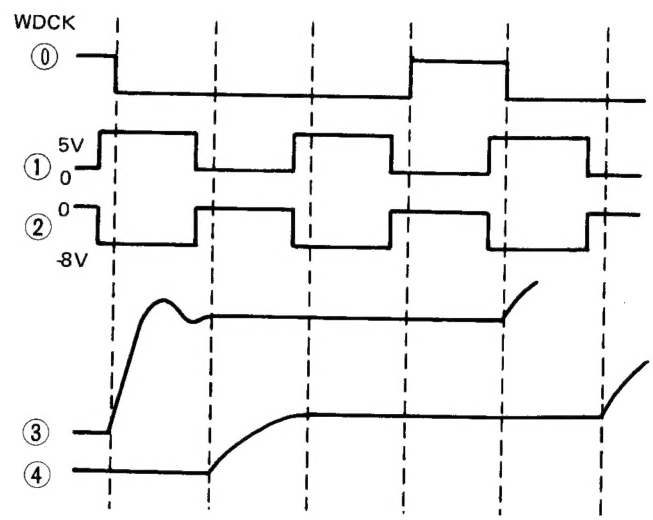


Fig. 5

CIRCUIT DESCRIPTION

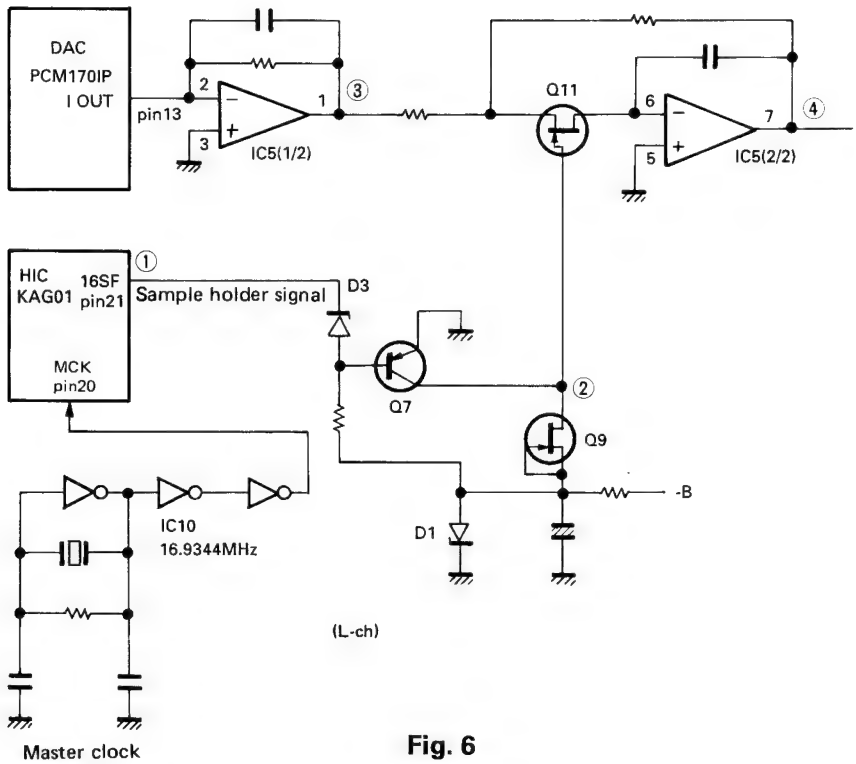


Fig. 6

• 20-bit D/A converter

This 20-bit D/A consists of a 18-bit D/A converter and additional external 2 bits [19SB and 20SB (LSB)].

If the data of 20 bits output from the digital filter are input as they are to the 18-bit DAC, 2- bits flow over. Accordingly, the data must be reduces by 2 bits. They are reduced by HIC and KAG01. HIC sends the 18-bit data, ranging from MSB to 18SB, to DAC (PCM 1701P).

Remaining 19SB and 20SB are detected and output in the conversion timing of DAC (WDCK), then they are weighed by resistance added to the output of DAC. By this operation, IC5 outputs 20bits.

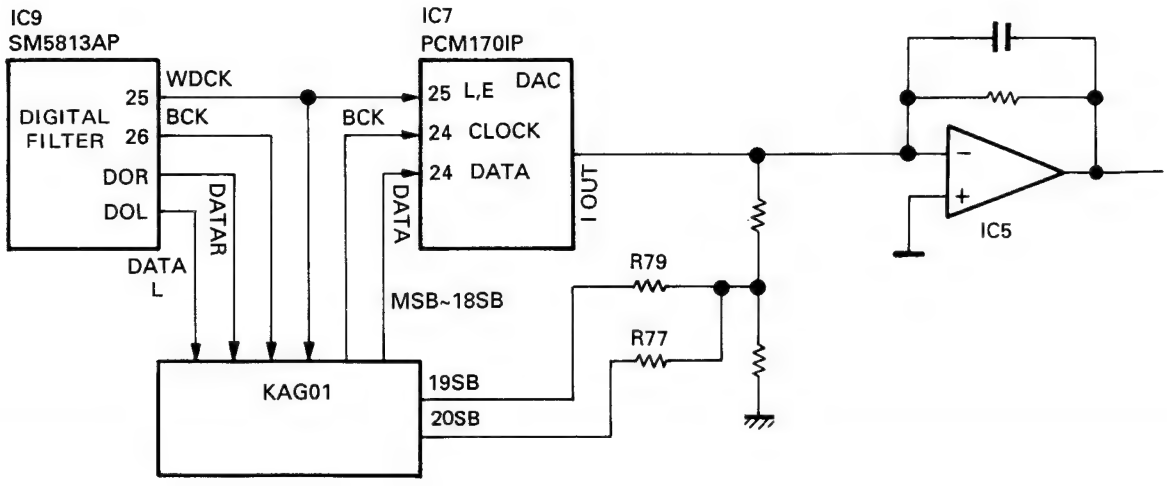
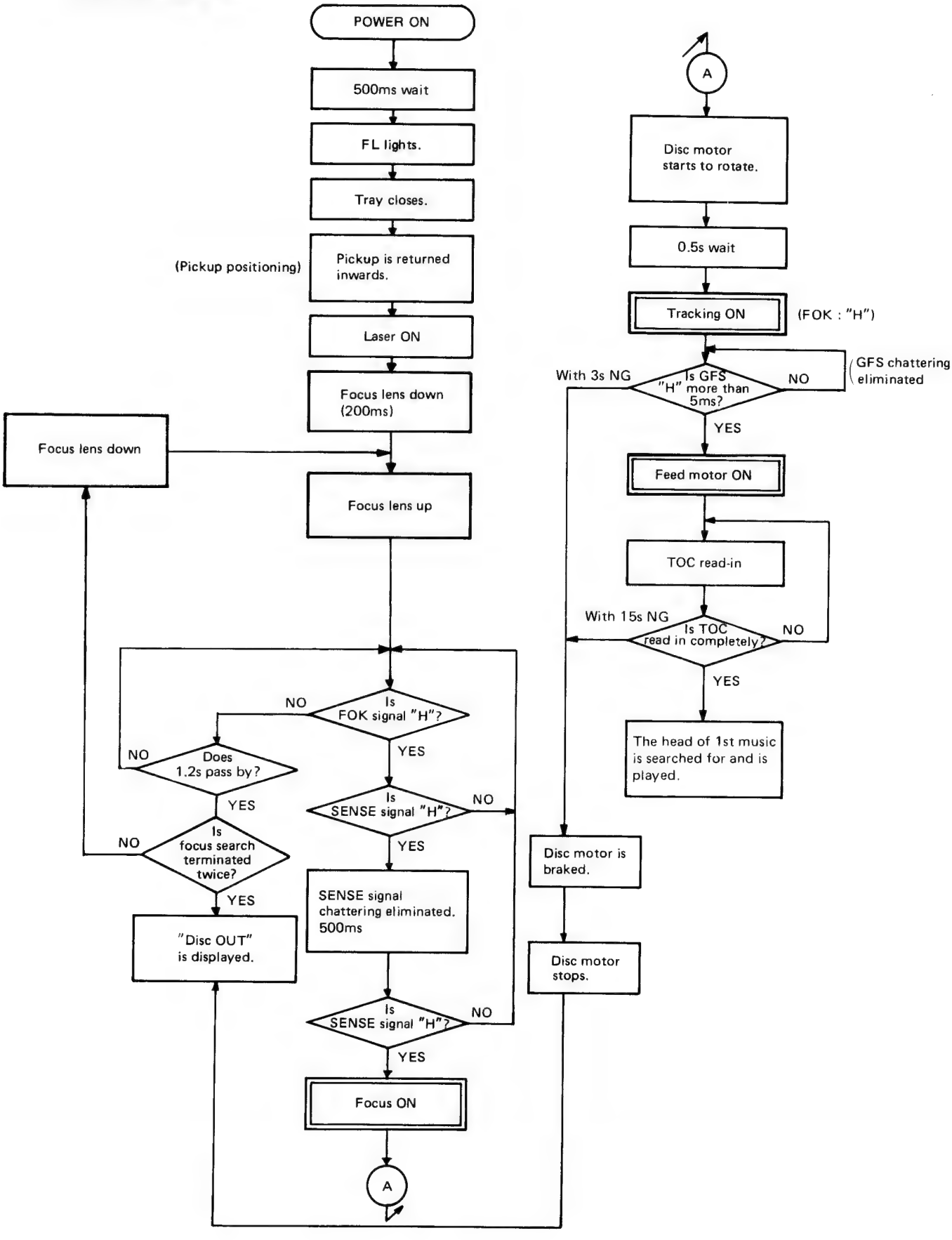


Fig. 7

CIRCUIT DESCRIPTION

3. Set Mode Flowchart

3–1. Outline after POWER ON

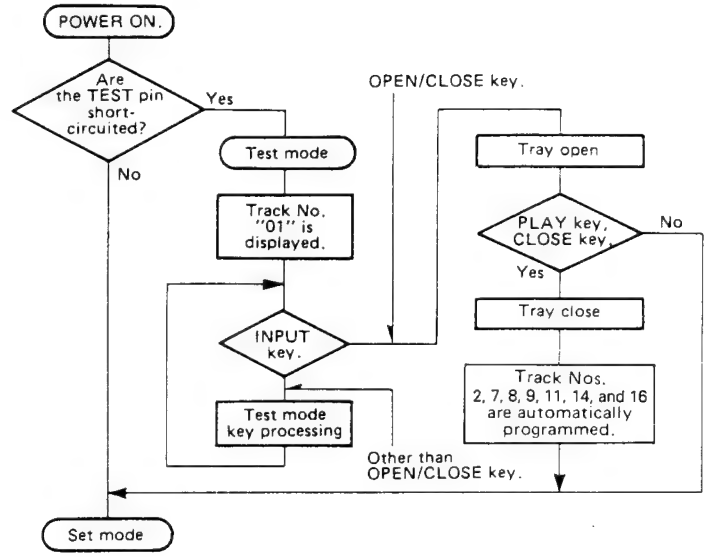


CIRCUIT DESCRIPTION

4. Test mode

With the DP-8020, the microprocessor can be set to test mode by short-circuiting pin 7 and pin 8 of the CD PLAYER UNIT (X32-1500).

Note : "Set mode" shows the normal status.



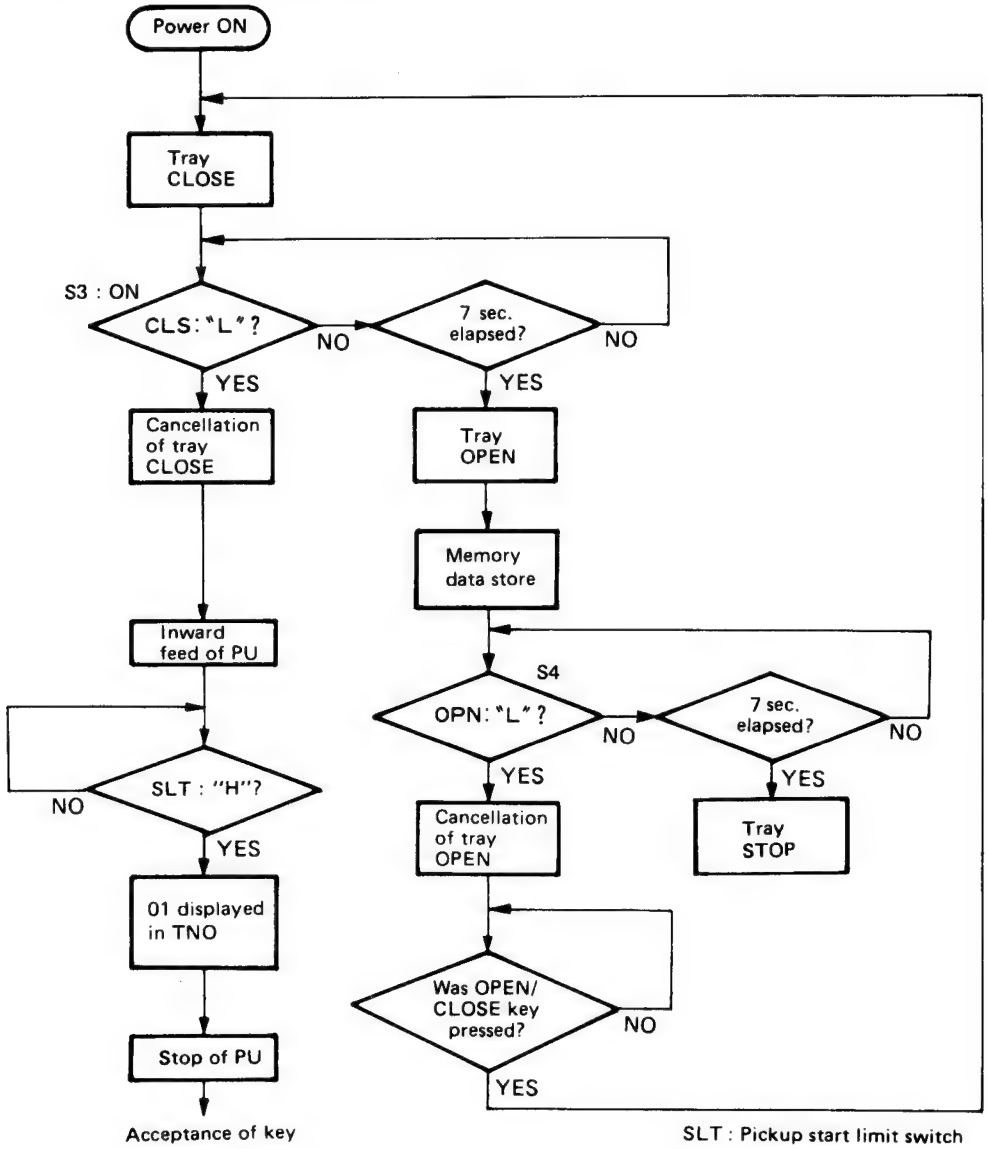
4-1. Key and functions valid in test mode

No.	Input key	Function	Track No. display
1	PLAY	(1) Focusing servo ..... ON (2) Tracking servo ..... ON (3) Feed servo ..... ON	TRACK NO. 05 PLAY (▶) Key lights Display for a few seconds after Disk track No.and time are displayed
2	STOP	Jamp to the first stop of TEST mode.	TRACK NO. 01
3	UP ▶▶|	(1) Focusing servo ..... ON (2) Tracking servo ..... OFF (3) Feed servo ..... OFF	TRACK NO. 03 PAUSE (❚❚) blinking P.C lights.
4	DOWN |◀◀	(1) Tray ..... Opened (2) Laser ..... ON The TEST mode goes on when the tray is closed by pressing the tray.	TRACK NO. 02 REPEAT lights
5	FF ▶▶	In the STOP mode, moves the pickup slightly toward the outer position of disc.	
6	FB ◀◀	In the STOP mode, moves the pickup slightly toward the inner position of disc.	
7	OPEN/CLOSE	When the tray is opened and the closed again in test mode, Track Nos 2, 7,8 9,11,14, and 16 are automatically programmed.	
8	DISPLAY OFF	All of FL's segments are light and PLAY and PAUSE indicator light.	

CIRCUIT DESCRIPTION

4–2. Flow chart of test mode

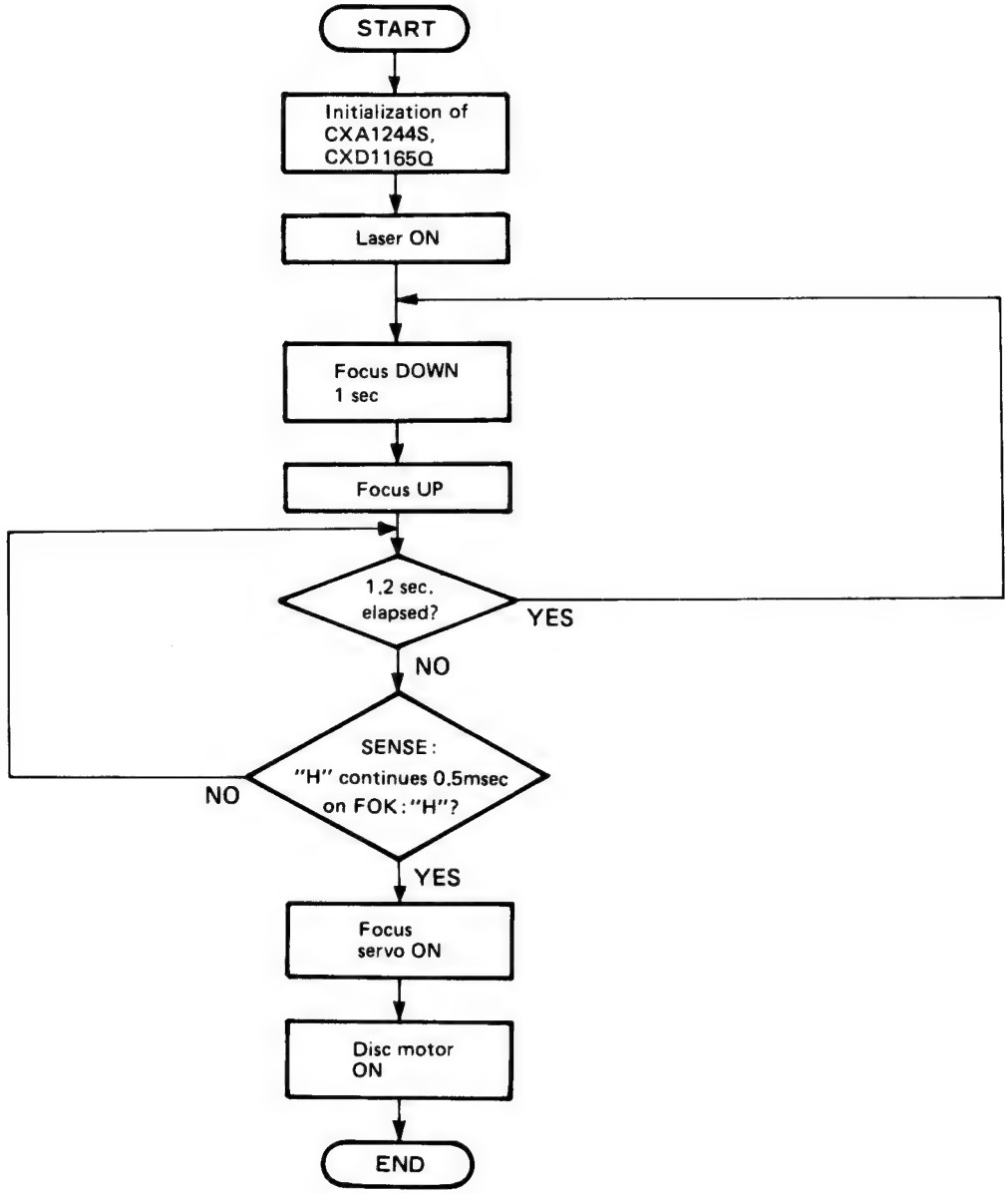
- **Flow chart from tray OPEN status after power ON**



SLT : Pickup start limit switch
CLS : Tray close detect switch
OPEN : Tray open detect switch

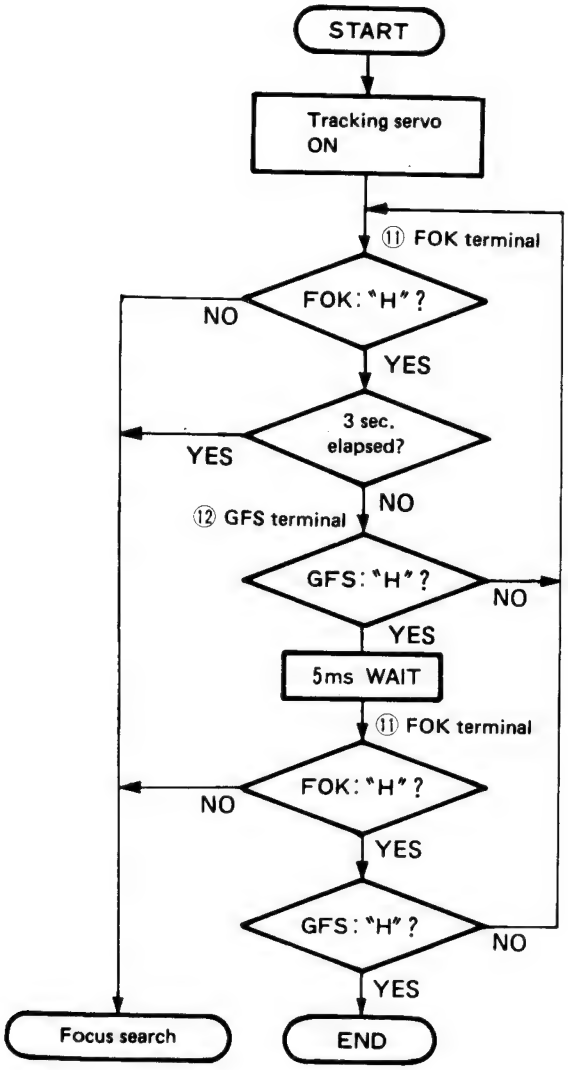
CIRCUIT DESCRIPTION

- **Focus search & focus servo ON**

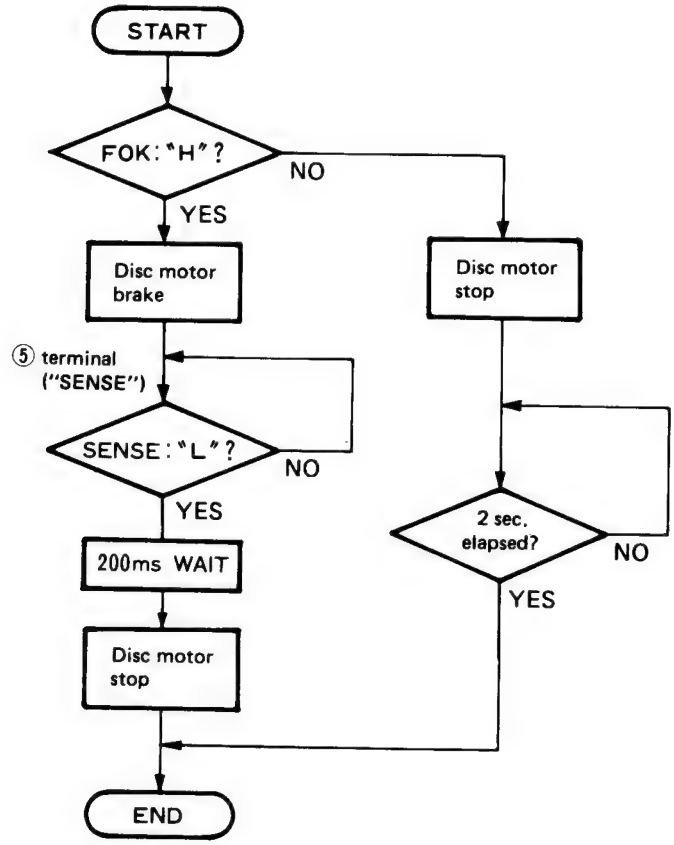


CIRCUIT DESCRIPTION

- Tracking servo ON

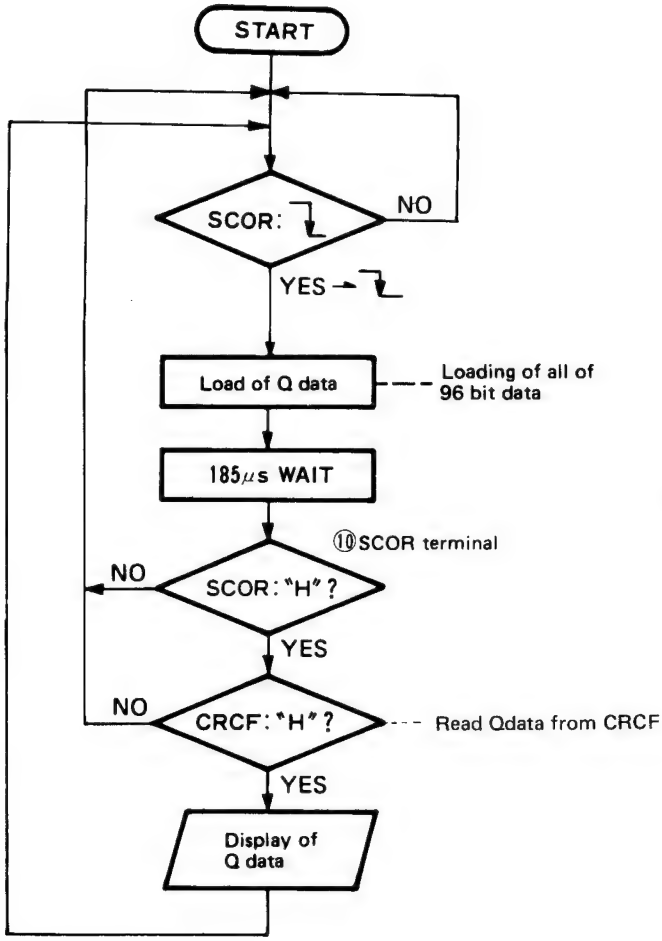


- Disc motor STOP

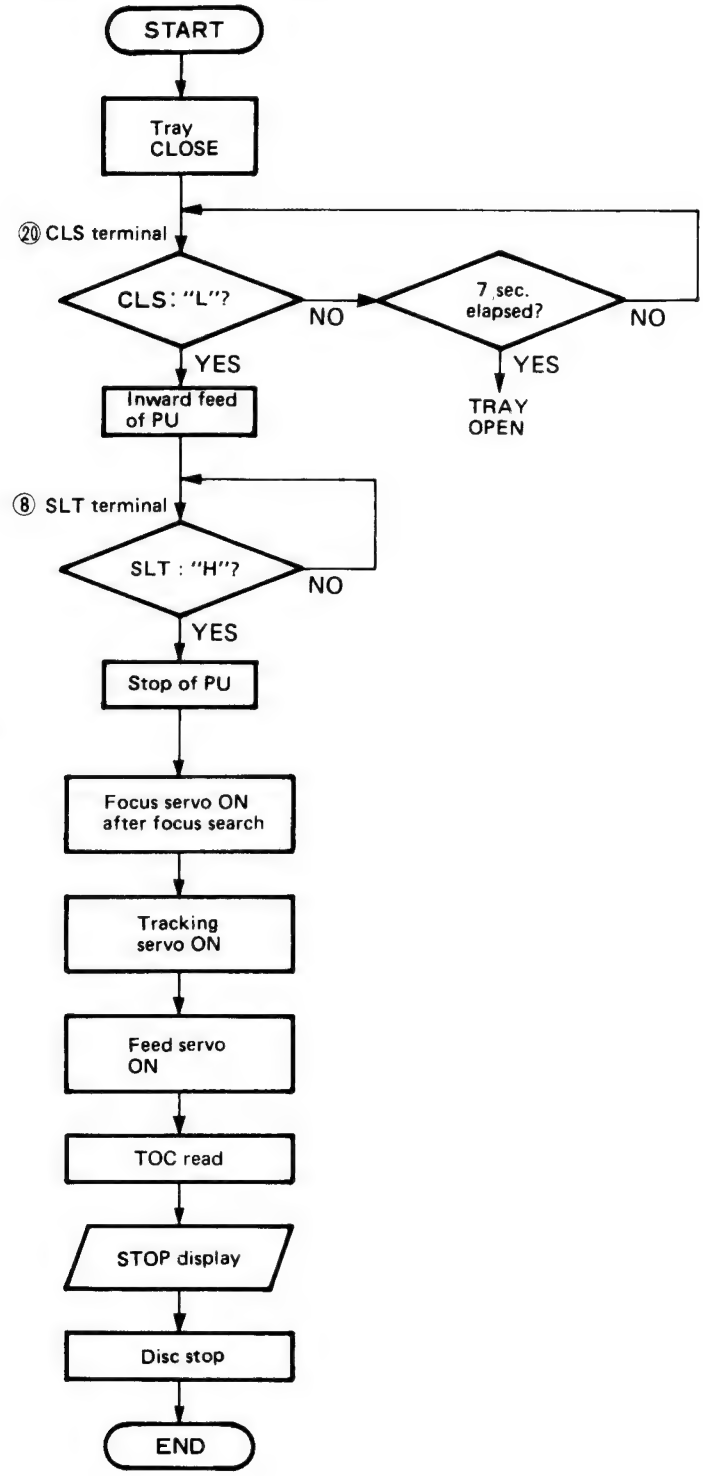


CIRCUIT DESCRIPTION

- From loading of Q data to display



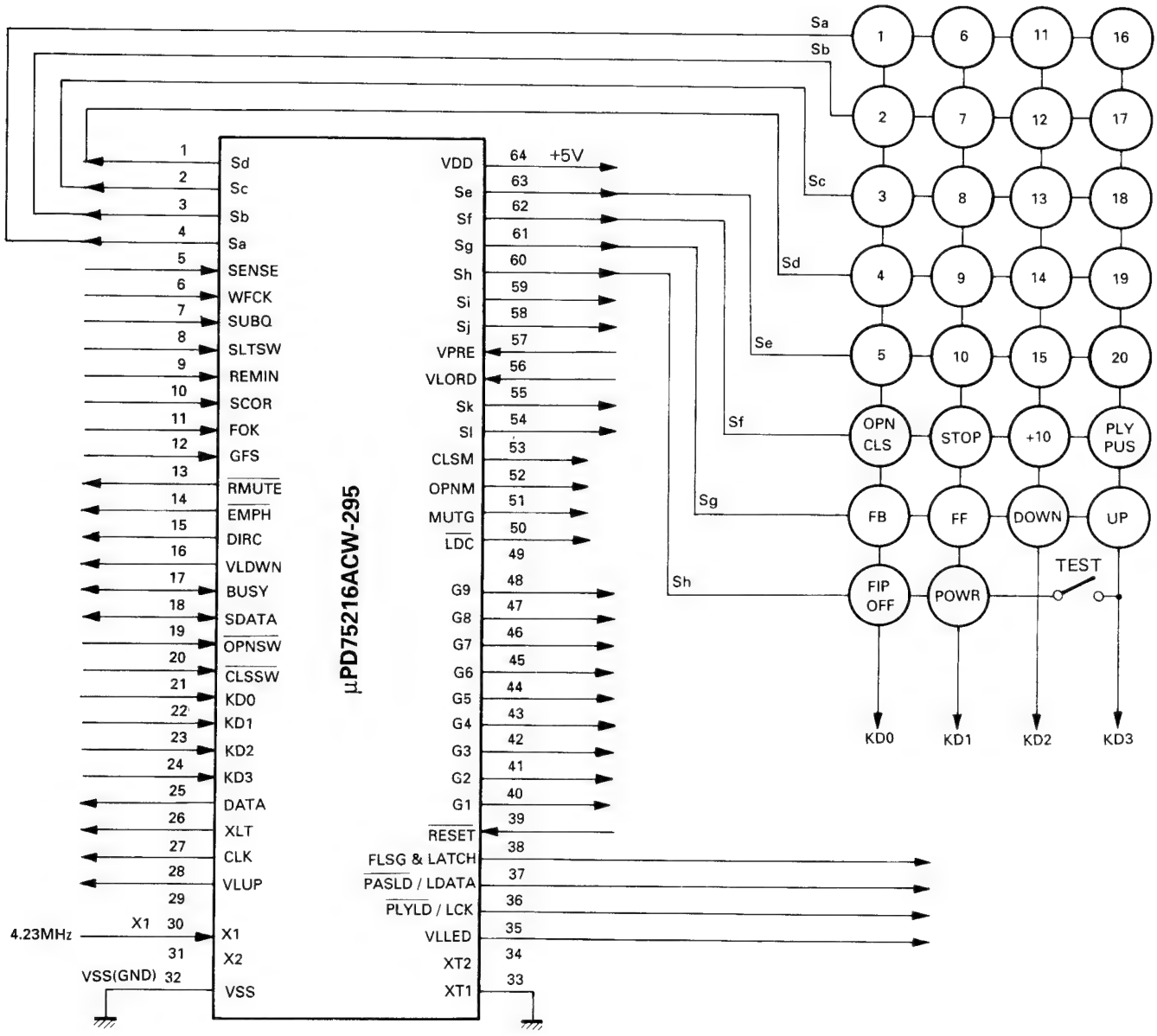
- In a usual case, since the tray was pushed when the tray is OPEN until STOP display is made.



CIRCUIT DESCRIPTION

5. Microprocessor μPD 75216ACW-295(X25-3820-00 : IC1)

5–1. Terminal connection diagram



CIRCUIT DESCRIPTION

5–2. Explanation of terminals

Pin No.	Pin Name	I/O	Function
1~4	Pd~Pa	O	FL segment control pins (also for key signal).
5	SENSE	I	Signal processing, pin to detect the SENSE signal from servo IC.
6	WFCK	I	Q data read-out clock pulse input pin.
7	SUBQ	I	Q data input pin.
8	SLTSW	I	Pickup stops (STOP : "H").
9	RCI	I	Remoto control input pin.
10	SCOR	I	Sub-code frame sync detection signal input pin.
11	FOK	I	RF amplifier FOK signal input pin (At focus OK : "H").
12	GFS	I	Frame sync signal input pin (In frame sync : "H").
13	$\overline{\text{REMUTE}}$	O	Relay mutes (ON : "L").
14	$\overline{\text{EMPH}}$	O	De-emphasis control pin (ON : "L").
15	DIRC	O	Servo IC DIRC pin .
16	VLDWN	O	Volume control level goes down.
17	BUSY	I/O	BUSY signal of serial data. (System control)
18	SDATA	I/O	Data signal of serial data. (System control)
19	$\overline{\text{OPNSW}}$	I	Tray open switch (When open : "L").
20	$\overline{\text{CLSSW}}$	I	Tray close switch (When close : "L").
21~24	KD0-KD3	I	Key matrix key return input pins.
25	DATA	O	Signal processing, servo IC control output pin (Control data signall).
26	XLT	O	Signal processing, servo IC control output pin (Control data latch signal).
27	CLK	O	Signal processing, servo IC control output pin (Control data transmission clock signal).
28	VLUP	O	Volume control level goes up.
29	–	–	Unused.
30	X1	I	System clock pulse input pin.
31	–	–	Unused.
32	Vss	–	GND.
33	XTI	–	GND.
34	–	–	Unused.
35	VLLED	O	LED for positioning output level (Blink : LEVEL varia).
36	PLYLD	O	PLAY LED lights.
37	PASLD	O	PAUSE LED lights.
38	FLSG	O	Key scan signal when FL OFF (FL OFF : "H").
39	$\overline{\text{RESET}}$	I	Reset input pin (Active "L").
40~48	G1~G12	O	FL digit control pins.
49	N.C	–	Unused.
50	LCD	O	Signal for laser ON/OFF (Active "L").
51	MUTG	O	Muting signal for signal processor.
52	OPNM	O	Tray OPEN/CLOSE signal (Active "H").
53	CLSM		
54,55	SI,Sk	O	FL segment control pins (also for key scan signal).
56	VLOAD	I	FL driver negative power supply (–30V).
57	VREF	I	FL pre-driver negative power supply (–5V).
58~63	Pj~Pe	O	FL segment control pins (also for key scan signal).
64	VDD	–	Power supply (+5V).

CIRCUIT DESCRIPTION

6. RF AMP CXA1081S (X32-1500-22 : IC104)

General

The CXA1081S is an IC developed for use in Compact Disc players. It incorporates a 3-spot optical pickup RF output amplifier, a focusing error amplifier, a tracking error amplifier, and other signal processing circuitry, such as focus OK, mirror, defect, and EFM comparator circuits, as well as a laser diode APC (Automatic Power Control) circuit.

Features

- Operates on a signal +5 V power supply, as well as on a ±5 V dual-voltage power supply.
- Low power consumption (100 mW with ±5 V, 50 mW with +5 V).
- An APC circuit which accepts either a P-sub or N-sub laser diode.
- A minimum of external parts required.
- A disc defect detector circuit for improved playability.

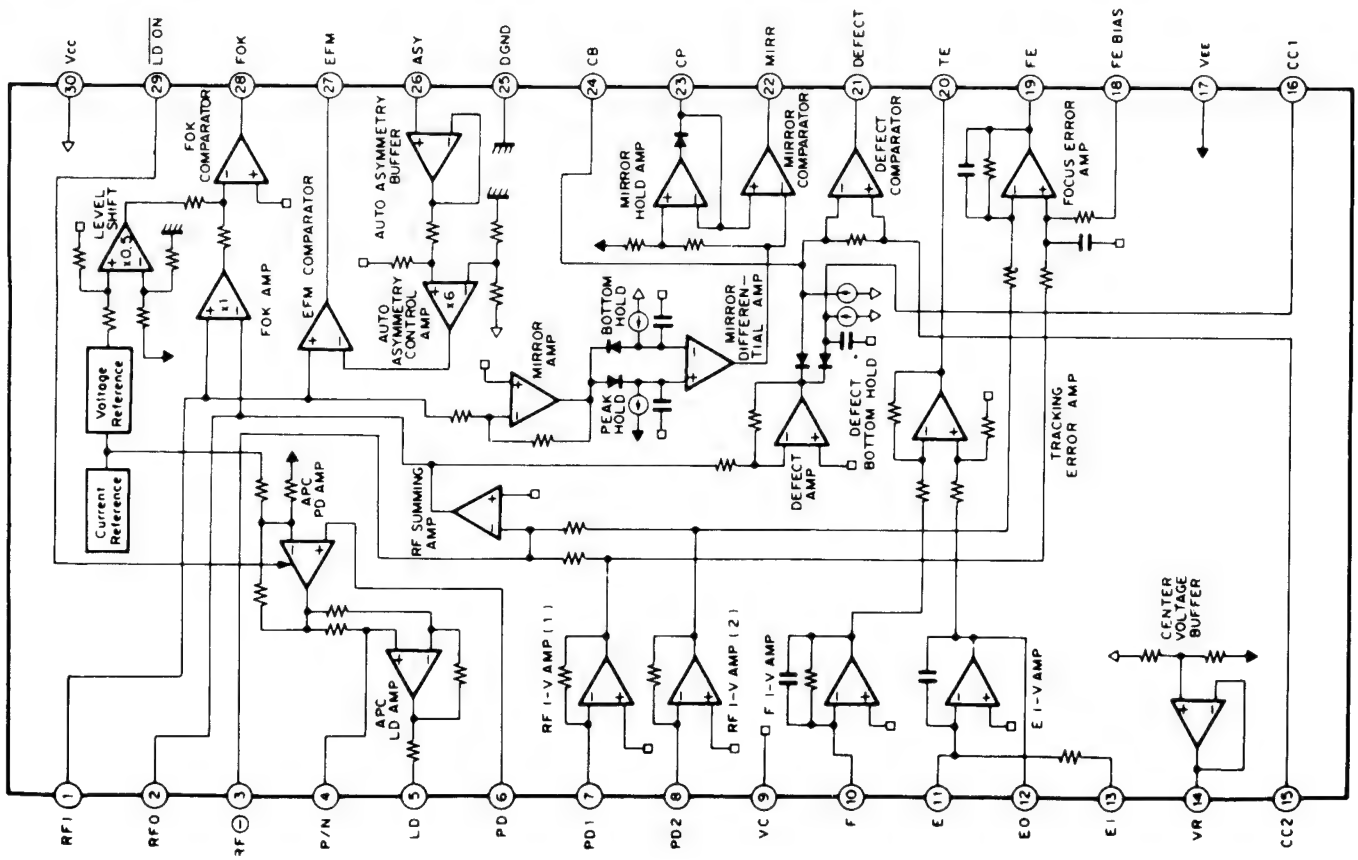
Structure

Bipolar silicon monolithic IC

Functions

- RF amplifier
- Focus OK detector circuit
- Mirror detector circuit
- Tracking error amplifier
- Defect detector circuit
- APC circuit
- EFM comparator
- Auto asymmetry control amplifier

6–1. Block diagram



CIRCUIT DESCRIPTION

6–2. Explanation of terminals (V_{CC}=2.5V, V_{EE}=D_{GND}=–2.5V, VC=GND)

Terminal No.	Terminal name	I/O	DC voltage (V)	Function
1	RFI	I	0	Input pin for the C-coupled signal output from the RF summing amplifier
2	RFO	O	V_{RFO}	RF summing amplifier output pin. Used as the check point for the eye pattern
3	RF⊖	I	0	RF summing amplifier feedback input pin.
4	P/N	I	0 (VC)	P-sub/N-sub select pin for the LD (Laser Diode) (DC voltage: in N-sub mode)
5	LD	O	–1.8	*APC LD amplifier output pin. (DC voltage: PD open in N-sub mode)
6	PD	I	0	*APC LD amplifier input pin. (DC voltage: open)
7	PD1	I	0	RF I-V amplifier (1) inverted input pin Current input by connecting to the photodiode A + C terminal
8	PD2	I	0	RF I-V amplifier (2) inverted input pin Current input by connecting to the photodiode B + D terminal
9	VC	—	0	Connected to GND when using a positive (+)/negative (–) dual-voltage power supply Connected to VR (pin 14) when using a single-voltage power supply
10	F	I	0	F I-V amplifier inverted input pin Current input by connecting to the photodiode F terminal
11	E	I	0	E I-V amplifier inverted input pin Current input by connecting to the photodiode E terminal
12	EO	O	0	E I-V amplifier output pin
13	EI	I	0	E I-V amplifier feedback input pin. For E I-V amplifier gain adjustment
14	VR	O	V_{CVO}	DC voltage output pin of (V_{CC} + V_{EE})/2
15	CC2	I	1.0	Input pin for the C-coupled signal output from the defect bottom hold
16	CC1	O	1.2	Defect bottom hold output pin
17	V_{EE}	—	–2.5	Connected to the negative power supply when using a positive (+)/negative (–) dual-voltage power supply. Connected to GND when using a single-voltage power supply
18	FE BIAS	I	0	Bias pin on the focus error amplifier non-inverted side For CMR adjustment of the focus error amplifier.
19	FE	O	V_{FEO}	Focus error amplifier output pin
20	TE	O	V_{TEO}	Tracking error amplifier output pin
21	DEFECT	O	V_{DFCT}	Defect comparator output pin. (DC voltage: connected to a 10 k-ohm load)
22	MIRR	O	V_{MIRR}	Mirror comparator output pin. (DC voltage: connected to a 10 k-ohm load)
23	CP	I	–1.3	Mirror hold capacitor output pin Mirror comparator non-inverted input
24	CB	I	0	Defect bottom hold capacitor connect pin
25	DGND	—	–2.5	Connected to GND when using a positive (+)/negative (–) dual-voltage power supply Connected to GND (V_{EE}) when using a single-voltage power supply.
26	ASY	I	—	Auto asymmetry control input pin
27	EFM	O	V_{EFMH}	EFM comparator output pin. (DC voltage: connected to a 10 k-ohm load)
28	FOK	O	V_{FOKL}	FOK comparator output pin. (DC voltage: connected to a 10 k-ohm load)
29	LD ON	I	–2.5 (DGND)	LD ON/OFF select pin. (DC voltage: when LD ON)
30	V_{CC}	—	2.5	Positive power supply.

*APC: Automatic Power Control

CIRCUIT DESCRIPTION

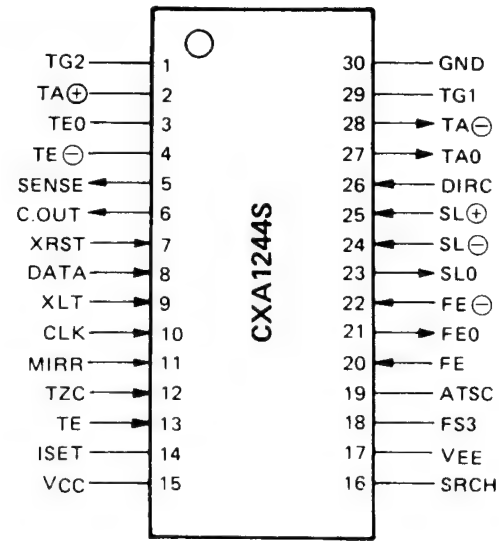
7. Servo control CXA1244S (X32-1500-22 : IC103)

CXA1244S is a bipolar IC developed for servo of compact disc (CD) players, and it provides the following functions.

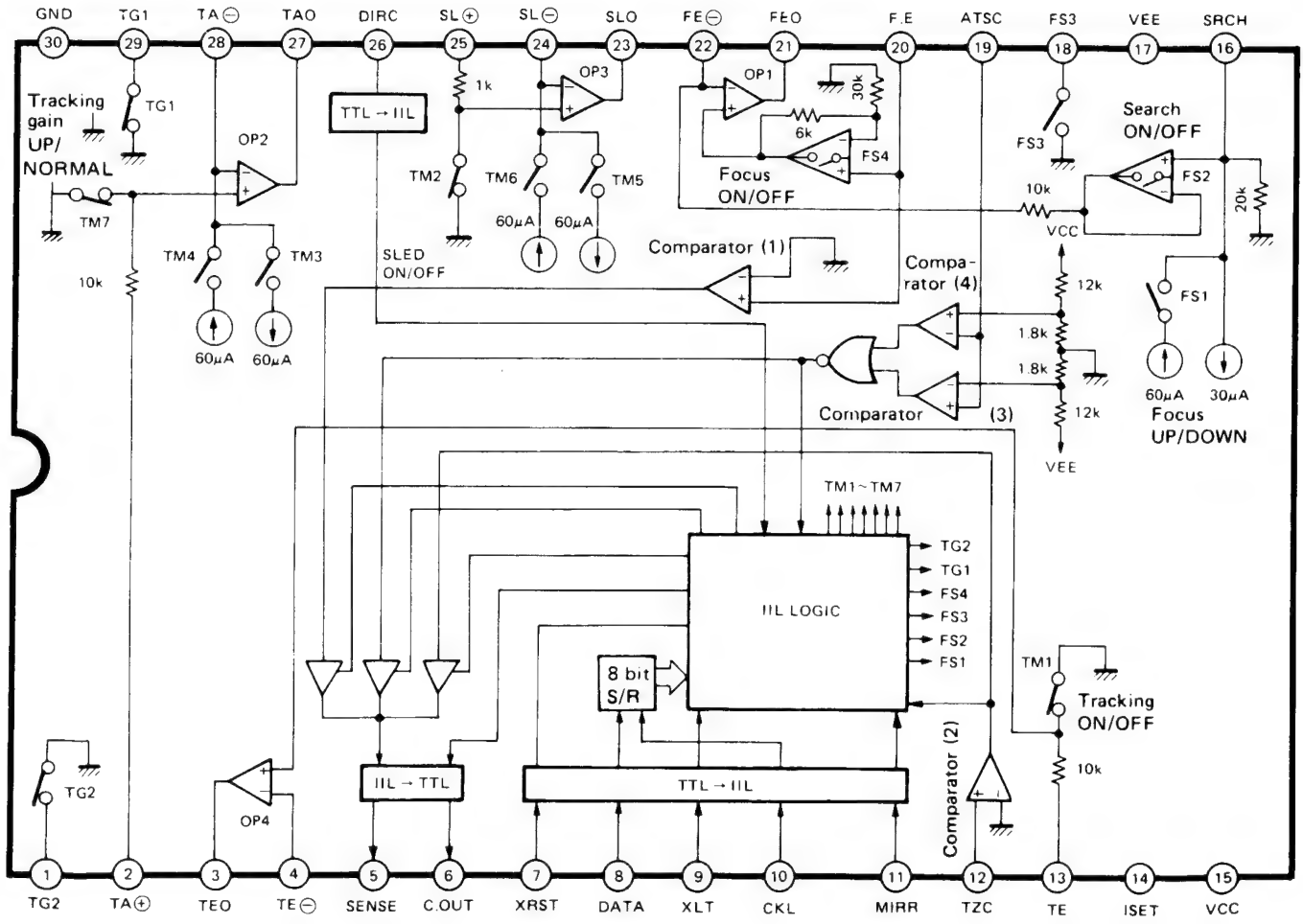
- ○Focus control (search ON/OFF, gain control)
- ○Tracking control (servo ON/OFF, single track jump, multiple track jump, gain control, phase compensation control, brake circuit)
- ○ Sled control (servo ON/OFF, fast forward, fast reverse)

Servo function of each of focus, tracking and sled as well as random access operation are realized through control by microcomputer. Furthermore, the serial data bus can be shared with CXD1125Q.

7–1. Terminal connection diagram



7–2. Block diagram



CIRCUIT DESCRIPTION

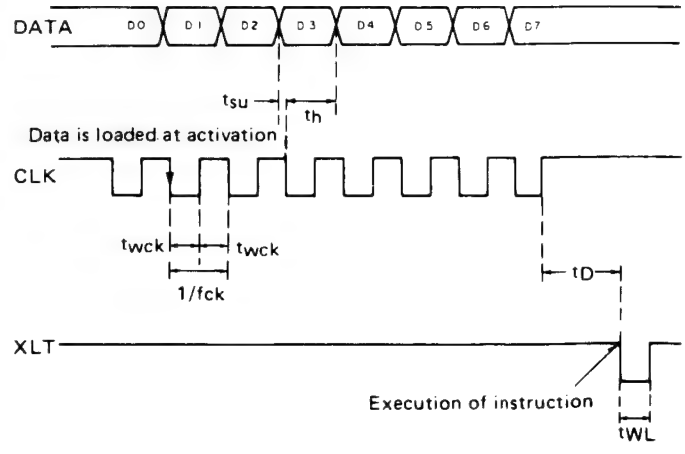
7–3. Explanation of terminals

Terminal No.	Terminal name	I/O	Functions
1	TG2		Tracking amplifier gain switching terminal. GND level.
2	TA ⊕		Non-inverted input of operational amplifier 2.
3	TE0		Output of operational amplifier 4.
4	TE ⊖	O	Inverted input of operational amplifier 4.
5	SENSE	O	Output of SSP internal status that corresponds to ADDRESS of CPU → SSP. (Changes in accordance with ADDRESS content of internal serial register.) See Note 1.
6	C. OUT	O	Signal output for counting number of tracks at the time of high speed access.
7	XRST	I	All internal registers are cleared when CPU → SSP "L". Connected with CPU RESET. See Note 2.
8	DATA	I	Serial data transmission of CPU → SSP. Input is made from LSB. D0~D7.
9	XLT	I	Latch of serial data of CPU → SSP. (The contents of internal serial register are transmitted to each address decoded latch.) Transmission at "L". Change to "H" occurs immediately after execution because no edge trigger is produced.
10	CLK	I	CPU → SSP serial data transmission clock. Data is read at falling. "H" level before and after transmission.
11	MIRR	I	Mirror signal input from RF amplifier.
12	TZC	I	Tracking error signal is input with C couple. The time constant is determined by one single track jump, but it is usually around 2kHz.
13	TE	I	Tracking error signal input.
14	ISET		Setting of current level for determining focus search voltage, tracking jump voltage and sled feed voltage.
15	Vcc		Power supply terminal. Normally −5V.
16	SRCH		The capacitor for determining the time constant of charge/discharge waveform for focus search is connected.
17	VEE		Power supply terminal. Normally −5V.
18	FS3		Focus amplifier gain switching terminal. GND level.
19	ATSC		Such information that a mechanical shock was applied to the player is input. Simply, a trakcing error is input through B.P.F.
20	FE	I	Input of focus error signal.
21	FE0	O	Output of operational amplifier 1.
22	FE ⊖	I	Inverted input of operational amplifier 1.
23	SL0	O	Output of operational output 3.
24	SL ⊖	I	Inverted input of operational amplifier 3.
25	SL ⊕	I	Non-inverted input of operational amplifier 3.
26	DIRC	I	Used at the time of one track jump. Normally "H". The direction of the track jump pulse is reversed with "L". Setting is made in the normal tracking mode by changing to "H" "L" for a fixed length of time with detection of activation, deactivation of TZC.
27	TA0	O	Output of operational amplifier 2.
28	TA ⊖	O	Inverted input of operational amplifier 2.
29	TG1		Tracking amplifier gain switching terminal. GND level.
30	GND		GND terminal of IC.

Note 1 : SENSE terminal output

Serial data upper 4 bits	ADDRESS content	SENSE terminal output	Explanation
0 0 0 0	FOCUS CONTROL	FZC	"H" when focus zero cross. Focus erro voltage is 0V or higher. Used at the time of FOCUS PULL operation.
0 0 0 1	TRACKING CONTROL	AS	"H" when the ATSC input level exceeds the wind comparator level (VTH = ±Vcc × 13%). But this is not used in this equipment.
0 0 1 0	TRACKING MODE	TZC	Judgement output of positive or negative of tracking zero cross. tracking error. When used at the time of single track jump, DIRC is reduced to "L" on detection of TZC ↑, in FWD JUMP or on detection of TZC ↓ in REV JUMP.

Note 2 : Digital unit timing chart



CIRCUIT DESCRIPTION

7–4. System control

COMMAND	ADDRESS				DATA				SENSE
	D7	D6	D5	D4	D3	D2	D1	D0	
FOCUS CONTROL	0	0	0	0	FS4 FOCUS ON	FS3 GAIN DOWN	FS2 SEARCH ON	FS1 SEARCH UP	FZC
TRACKING CONTROL	0	0	0	1	ANTI SHOCK	BREAK ON	TG2 GAIN	TG1* SET	AS
TRACKING MODE	0	0	1	0	TRACKING* MODE		SLED* MODE		TZC

GAIN SET* TG1, TG2 may be set independently.
In the case of ANTI SHOCK = 1 (00011XXX), both TG1, TG2 are inverted when ANTI SCHOCK = "H".

SLED MODE*

	D1	D0
OFF	0	0
SERVO ON	0	1
FWD MOVE	1	0
REV MOVE	1	1

TRACKING MODE*

	D3	D2
OFF	0	0
SERVO ON	0	1
FWD JUMP	1	0
REV JUMP	1	1

CIRCUIT DESCRIPTION

8. Digital signal processor CXD1165Q(X32-1500-22 : IC11)

General

The CXD1165Q is a digital signal processing LSI for a Compact Disc player, and has the following functions.

1. Bit clock reproduction by an EFM-PLL circuit
2. EFM data demodulation
3. Frame sync signal detection, protection and insertion
4. Powerful error detection and correction
5. Interpolation with an average value, or by holding the previous value
6. Demodulation of a sub code signal, error detection of a sub code Q
7. Spindle motor CLV servo
8. 8-bit tracking counter
9. CPU interface with a serial bus
10. Sub code Q register
11. Digital audio interface output.
12. RAM the entrails.

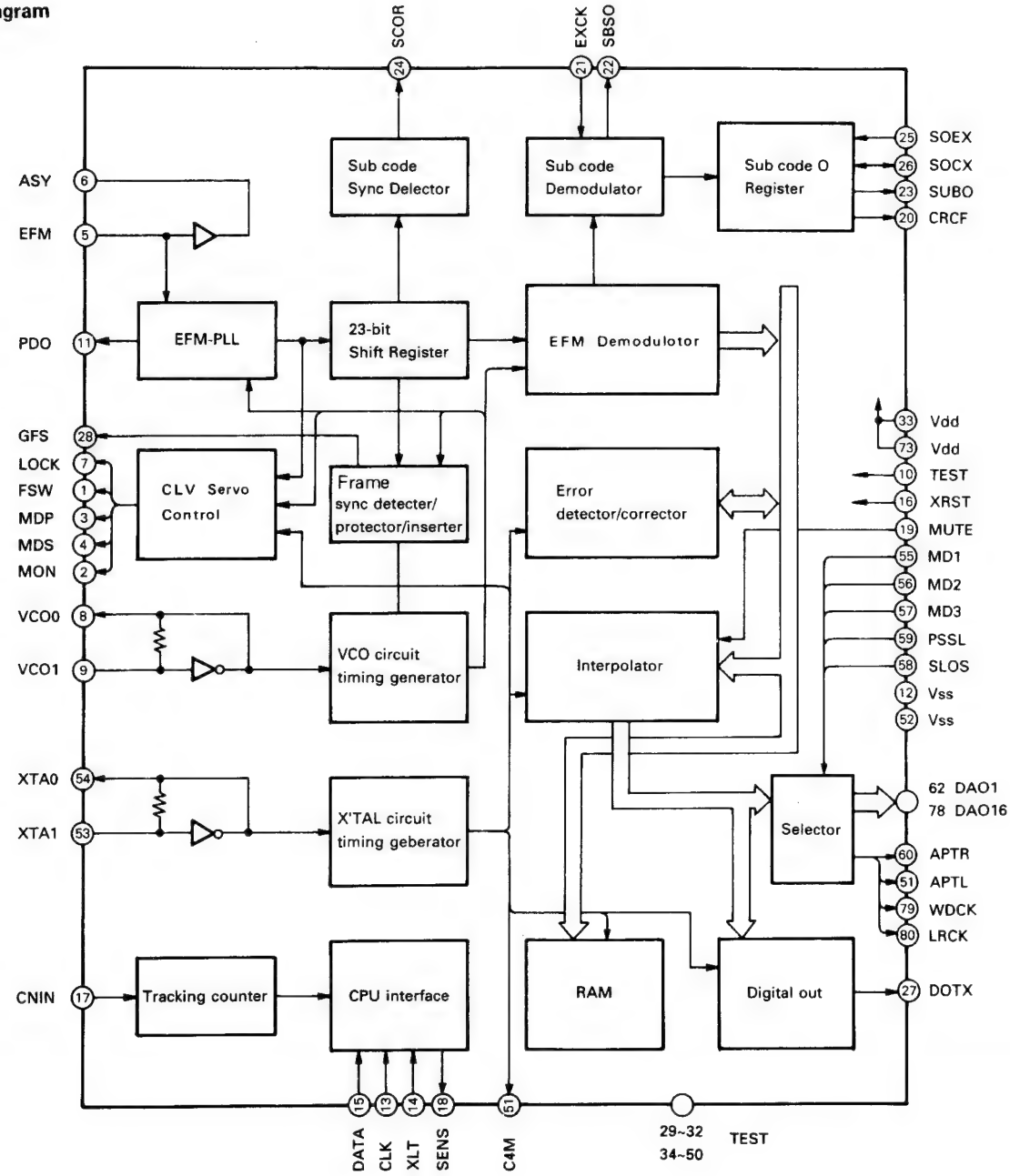
Features

- All digital signals used in playback can be processed using only a single chip.
- An aperture-correction digital filter is built in

Structure

CMOS IC

8–1. Block diagram



CIRCUIT DESCRIPTION

8–2. Explanation of terminals

Terminal No.	Terminal name	I/O	Function
1	FSW	O	Time constant switching output of output filter of spindle motor
2	MON	O	ON/OFF control output of spindle motor
3	MDP	O	Drive output of spindle motor. Rough speed control in CLV-S mode and phase control in CLV-P mode
4	MDS	O	Drive output of spindle motor. Speed control in CLV-P mode
5	EFM	I	EFM signal input from RF amplifier
6	ASY	O	Output for controlling the slice level of EFM signal
7	LOCK	O	Samples the GFS signal with WFCK/16, and outputs "H" when the level is high. When it is "L" for eight times, in arrow, outputs "L"
8	VCOO	O	VCO output f = 8.6436 MHz when locked to EFM signal
9	VCOI	I	VCO input
10	TEST	I	(0 V)
11	PDO	O	Phase comparison output of EFM signal and VCO/2
12	V_{SS}	—	GND (0 V)
13	CLK	I	Serial data transmission clock input from CPU. Data is latched at rising edge of a clock
14	XLT	I	Latch input from CPU. Data (serial data from CPU) from the 8 bit shift register is latched in each register
15	DATA	I	Serial data input from CPU
16	XRST	I	System reset input. Reset at "L"
17	CNIN	I	Input of tracking pulse
18	SENS	O	Output of internal status in correspondence to the address
19	MUTG	I	Muting input. In the case when ATTM of internal register A is "L". Normal status when MUTG is "L" or soundless state when it is "H"
20	CRCF	O	Output of result of CRC check of sub code Q
21	EXCK	I	Clock input for sub code serial output
22	SBSO	O	Sub code serial output
23	SUBQ	O	Sub code Q output
24	SCOR	O	Sub code sync S0 + S1 output
25	SQCK	I/O	Sub code Q read-off clock
26	SQEX	I	SQCK select input
27	DOTX	O	DIGITAL OUT output. (Outputs the $\overline{\text{WFCK}}$ signal when CXD1130Q or D0 is off)
28	GFS	O	Display output of frame sync lock status
29	DB08	I/O	H or L position. Don't open circuit.
30	DB07	I/O	H or L position. Don't open circuit.
31	DB06	I/O	H or L position. Don't open circuit.
32	DB05	I/O	H or L position. Don't open circuit.
33	V_{DD}	—	Power supply (+ 5 V)
34	DB04	I/O	H or L position. Don't open circuit.
35	DB03	I/O	H or L position. Don't open circuit.
36	DB02	I/O	H or L position. Don't open circuit.
37	DB01	I/O	H or L position. Don't open circuit.
38	RA01	O	H or L position. Don't open circuit.
39	RA02	O	H or L position . Don't open circuit.
40	RA03	O	H or L position. Don't open circuit.
41	RA04	O	H or L position. Don't open circuit.
42	RA05	O	H or L position. Don't open circuit.
43	RA06	O	H or L position. Don't open circuit.

CIRCUIT DESCRIPTION

Terminal No.	Terminal name	I/O	Function
44	RA07	O	H or L position. Don't open circuit.
45	RA08	O	H or L position. Don't open circuit.
46	RA09	O	H or L position. Don't open circuit.
47	RA10	O	H or L position. Don't open circuit.
48	RA11	O	H or L position. Don't open circuit.
49	RAWE	O	H or L position. Don't open circuit.
50	RACS	O	H or L position. Don't open circuit.
51	C4M	O	Crystal dividing output f = 4.2336 MHz
52	V_{SS}	—	GND (0 V)
53	XTAI	I	Crystal oscillator input f = 8.4672 MHz or 16.9344 MHz depending on the mode selected
54	XTAO	O	Crystal oscillator output f = 8.4672 MHz or 16.9344 MHz depending on the mode selected
55	MD1	I	Mode select input 1
56	MD2	I	Mode select input 2
57	MD3	I	Mode select input 3
58	SLOB	I	Audio data output code select input. 2's complement output when "L", offset binary output when "H"
59	PSSL	I	Audio data output mode select input. Serial output when "L", parallel output when "H"
60	APTR	O	Aperture compensation control output. "H" when R-ch
61	APTL	O	Aperture compensation control output. "H" when L-ch
62	DA01	O	DA01 (parallel audio data LSB) output when PSSL = "H", C1F1 output when PSSL = "L"
63	DA02	O	DA02 output when PSSL = "H", C1F2 output when PSSL = "L"
64	DA03	O	DA03 output when PSSL = "H", C2F1 output when PSSL = "L"
65	DA04	O	DA04 output when PSSL = "H", C2F2 output when PSSL = "L"
66	DA05	O	DA05 output when PSSL = "H", C2FL output when PSSL = "L"
67	DA06	O	DA06 output when PSSL = "H", C2PO output when PSSL = "L"
68	DA07	O	DA07 output when PSSL = "H", RFCK output when PSSL = "L"
69	DA08	O	DA08 output when PSSL = "H", WFCK output when PSSL = "L"
70	DA09	O	DA09 output when PSSL = "H", $\overline{\text{PLCK}}$ output when PSSL = "L"
71	DA10	O	DA10 output when PSSL = "H", UGFS output when PSSL = "L"
72	DA11	O	DA11 output when PSSL = "H", GTOP output when PSSL = "L"
73	V_{DD}	—	Power supply (+5 V)
74	DA12	O	DA12 output when PSSL = "H", RAOV output when PSSL = "L"
75	DA13	O	DA13 output when PSSL = "H", C4LR output when PSSL = "L"
76	DA14	O	DA14 output when PSSL = "H", $\overline{\text{C210}}$ output when PSSL = "L"
77	DA15	O	DA15 output when PSSL = "H", C210 output when PSSL = "L"
78	DA16	O	DA16 (parallel audio data MSB) output when PSSL = "H", DATA output when PSSL = "L"
79	WDCK	O	Strobe signal output. 176.4 kHz when DF is ON, 88.2 kHz with CXD1125Q or when DF is OFF.
80	LRCK	O	Strobe signal output. 88.2 kHz when DF is ON, 44.1 kHz with CXD1125Q or when DF is OFF.

Notes:

C1F1 :
C1F2 : Error correction status monitor output for C1 decode.

C2F1 :
C2F2 : Error correction status monitor output for C2 decode.

C2FL : Correction status output. Goes "H" when the currently corrected C2 series data cannot be corrected.

C2PO : C2 pointer signal. Synchronized to the audio data output.

RFCK : Read frame clock output. 7.35 MHz when locked to the crystal line.

WFCK : Write frame clock output. 7.35 MHz when locked to the crystal line.

$\overline{\text{PLCK}}$: VCO/2 output. f = 4.3218 MHz when locked to the EFM signal.

UGFS : Non-protected frame sync pattern output.

GTOP : Frame sync protect status display output.

RAOV : ±4 frame jitter absorption RAM overflow and underflow display output.

C4LR : Strobe signal. 352.8 kHz when DF is ON, 176.4 kHz with CXD1125Q or when DF is OFF.

BLCK : Output of bit clock. 2.1168MHz

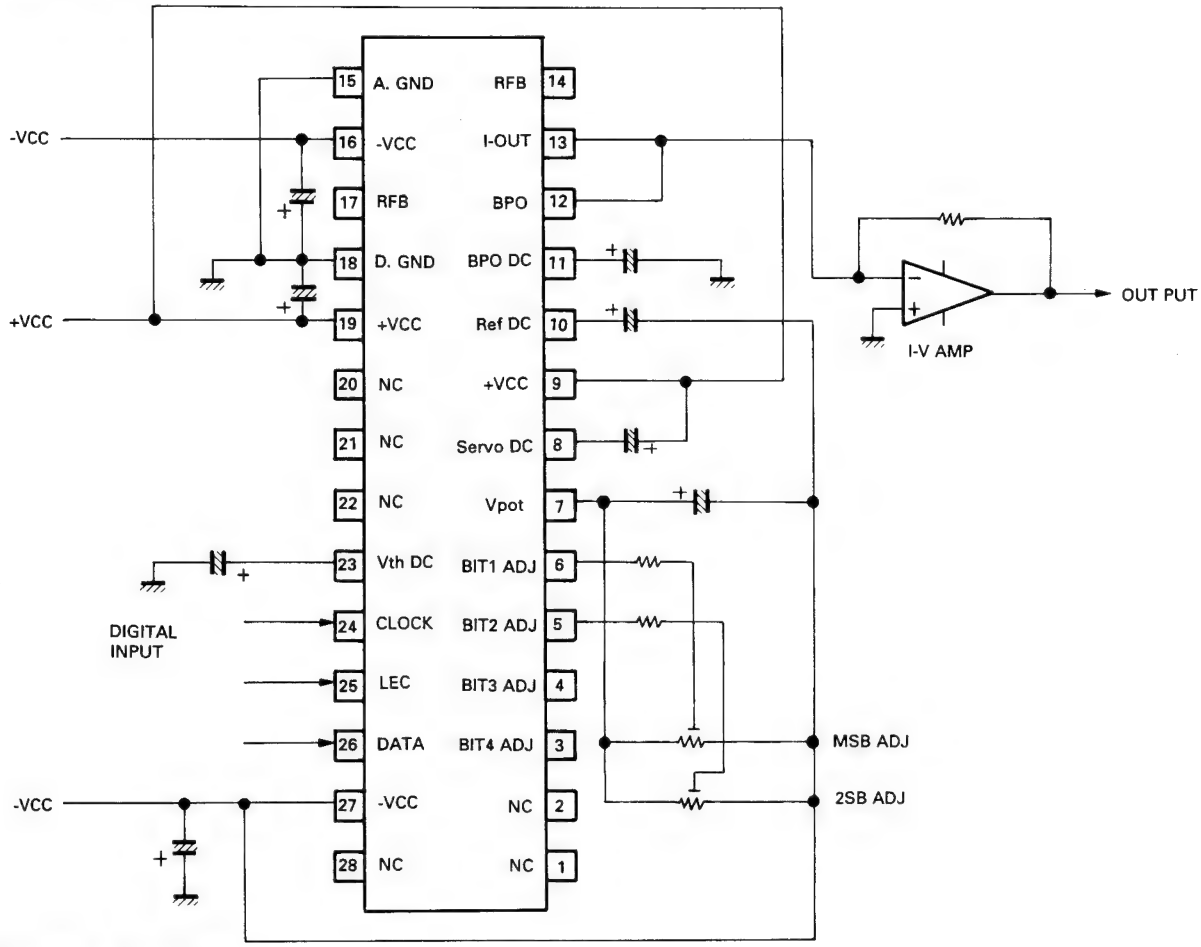
$\overline{\text{BLCK}}$: Inverted output bit clock.

DATA : Audio signal serial data output.

CIRCUIT DESCRIPTION

9. 18-bit serial input D/A converter PCM1701P(X32-1500-22 : IC6,IC7)

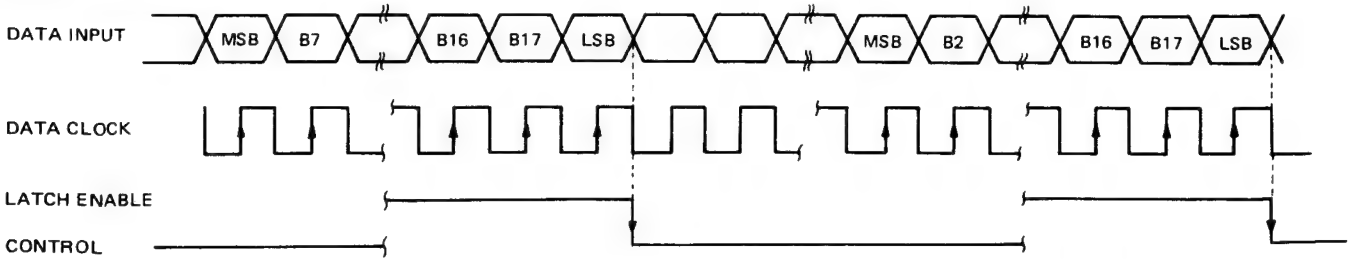
9-1. Terminal connection diagram



9-2. Terminal connections

Pin No.	Name	Pin No.	Name	Pin No.	Name
1	NC	11	BPO Filter	21	NC
2	NC	12	Bipolar offset	22	NC
3	Bit 4 ADJ	13	Power supply output	23	VTH filter
4	Bit 3 ADJ	14	RF	24	Clock input
5	Bit 2 ADJ	15	Analog common	25	LEC input
6	Bit 1 ADJ	16	–Vcc	26	DATA input
7	V POT	17	RF	27	–Vcc
8	Servo filter	18	Digital common	28	NC
9	+Vcc	19	+Vcc		
10	Reference filter	20	NC		

9-3. Timing chart



- The data format is of 2's complement, right-justified or continuous data of MSB first.
- Data is taken in to the shift register at the rise of the data clock pulse.

CIRCUIT DESCRIPTION

10. 8x over-sampling digital filter SM5813AP (X32-1500-22 : IC9)

10-1. Function

- 2-channel processing
- 8x over-sampling (interpolation) filter
  (hereinafter referred to as 8fs for short)
- Serial input data
  2's complement, MSB first
  16-bit
- Serial output data
  MSB first
  2's complement/COB selectable
  Selectable between 16-, 18- and 20-bit
- Jitter-free
  Prevents any faulty operation due to the jitter of the input clock signal, thus eliminating the jitter transmission over to the output.
- System clock pulse
  Selectable from 192fs, 256fs, 384fs and 512fs
- Crystal oscillation circuit incorporated
- I/O TTL compatible
- 5 V single power supply
- 28-pin plastic DIP

10-2. Filter configuration

- Interpolation filter
  Linear phase FIR filter 3-stage configuration
  First stage (fs — 2fs), 153rd
  Second stage (2fs — 4fs), 29th
  Third stage (4fs — 8fs), 17th
- 22-bit filter coefficient, 20x22 bit parallel multiplier/25-bit accumulator high-accuracy operation
- Overflow limiter incorporated

10-3. Applications

- CD playback
- DAT playback
- PCM playback

10-4. Filter characteristics

Characteristic item	Performance
Pass band	0 ~ 0.4535fs
Reject band	0.5465fs ~ 7.4535fs
Pass band ripple	Within ±0.00005dB
Reject band attenuation	More than 110dB
Group delay time	Fixed

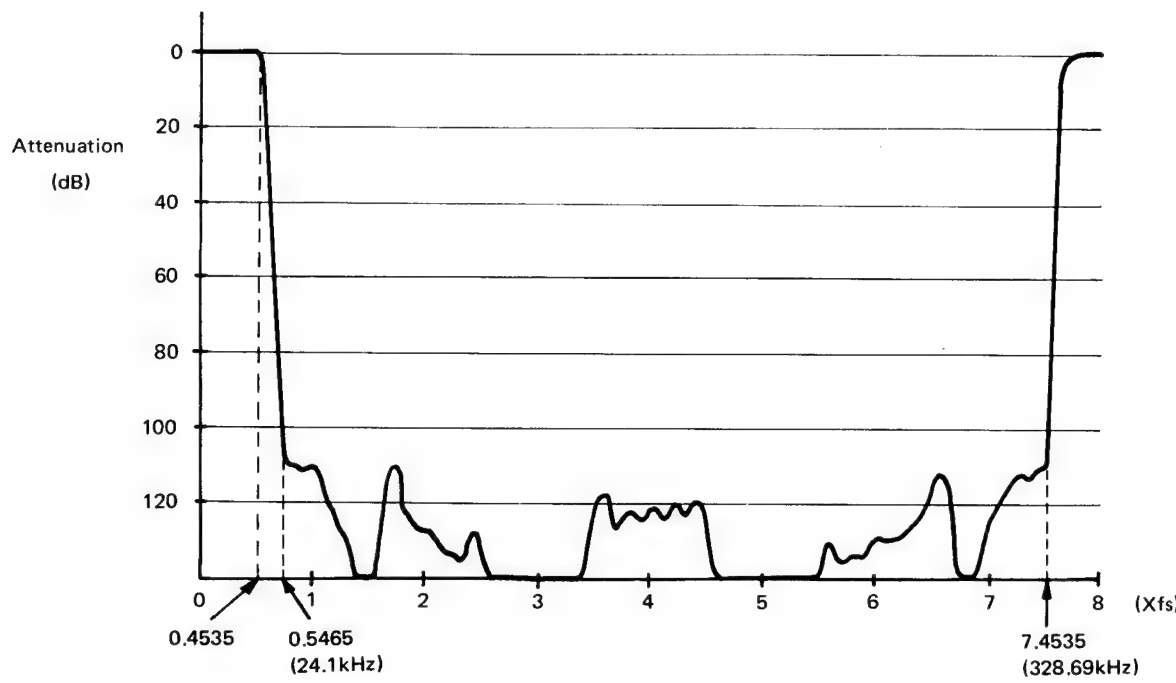
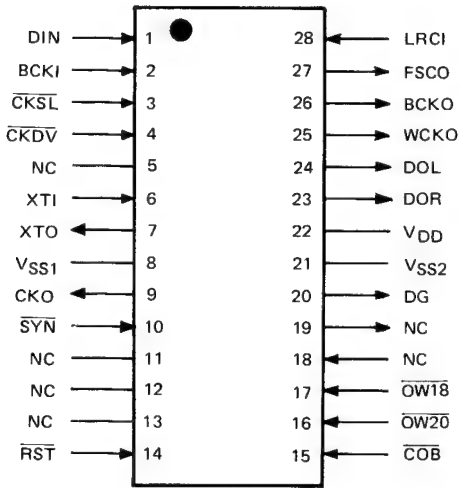


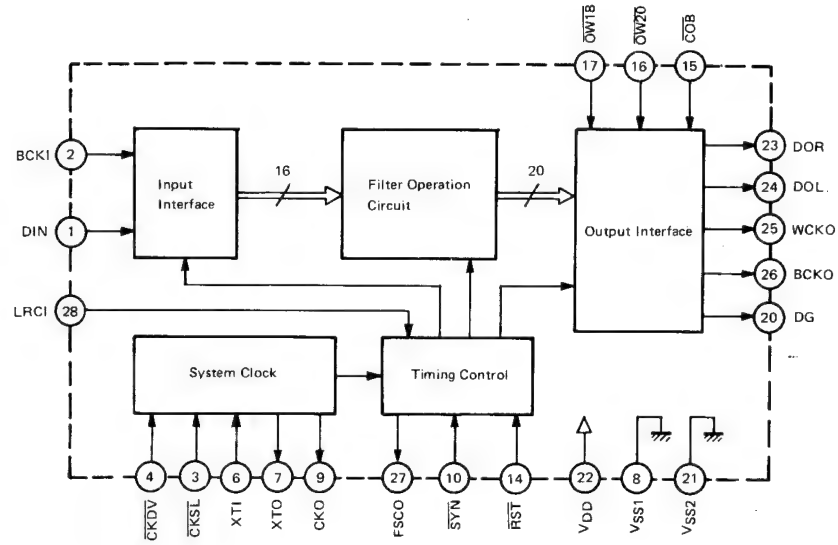
Fig. 8 Frequency response

CIRCUIT DESCRIPTION

10–5 Terminal connection diagram



10–6 Block diagram



10–7. Explanation of terminals

"fs" occurring in the description means the sampling frequency of the input data.

Pin No.	Pin Name	I/O	Function
1	DIN	I	Input data.
2	BCKI	I	Input data beat clock pulse.
3,4	$\overline{CKSL}$, $\overline{CKDV}$	I	XTI pin input frequency selection. (For details, refer to the description of XTI pin.)
5	NC	–	Unused.
6	XTI	I	Oscillator section input pin. 192 fs : CKSL = "H", CKDV = "H" 256 fs : CKSL = "H", CKDV = "L" 384 fs : CKSL = "L", CKDV = "H" 512 fs : CKSL = "L", CKDV = "L"
7	XTO	O	Oscillator section output pin.
8	V_{SS1}	–	GND1.
9	CKO	O	Oscillator section output clock pulse. (Frequency is the same as in XTI pin.)
10	$\overline{SYN}$	I	Jitter-free mode/compulsory sync mode selection. ("H : Jitter-free mode, "L" : Compulsory sync mode)
11~13	NC	–	Unused.
14	$\overline{RST}$	I	System reset. ("H" : normal operation, "L" : system reset)
15	$\overline{COB}$	I	2's complement/COB selection. ("H" : 2's complement, "L" : $\overline{COB}$)
16,17	$\overline{OW20}$, $\overline{OW18}$	I	Number-of-output-bits selection.

No. of output bits	16	18	20
$\overline{OW18}$	H	L	H
$\overline{OW20}$	H	H	L

18,19	NC	–	Unused.
20	DG	O	Deglitch control clock pulse.
21	V_{SS2}	–	GND2.
22	V_{DD}	–	Power supply (+5V).
23	DOR	O	Rch 8x over-sampling output data.
24	DOL	O	Lch 8x over-sampling output data.
25	WCKO	O	Output data word clock pulse.
26	BCKO	O	Output data bit clock pulse.
27	FSCO	O	fs-period internal operation timing clock pulse.
28	LRCI	I	Input data sampling rate (fs) clock pulse. ("H" : Lch, "L" : Rch)

CIRCUIT DESCRIPTION

10-8. Function

• 8x over-sampling (interpolation) filter function

This function works to output the over-sampling data of sampling rate 8fs. In this case, sampling noises between 0.5465fs (24.1kHz) and 7.4535fs (328.69kHz) are removed.

The interpolation operation block configuration of this LSI is of a cascade connection of three 2x interpolation filters (FIR).

• System clock (XTI, XTO, CKO, $\overline{\text{CKSL}}$, $\overline{\text{CKDV}}$)

The system clock pulse can be selected from 192fs, 256fs, 384fs and 512fs. More, operation is feasible even by an external clock (input to pin XTI) or a crystal oscillator (inserted between pins XTI and XTO). In this unit, a clock pulse of 8.4672 MHz is input to pin XTI.

From pin CKO, the system clock pulse is output. (See Figure 10.)

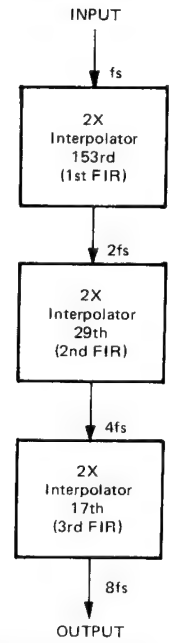


Fig. 9 Configuration of basic operation section

$\overline{\text{CKDV}}$		H		L	
$\overline{\text{CKSL}}$		H	L	H	L
XTI input clock frequency (Fxi)	Fxi = 1/tXI	192fs	256fs	384fs	512fs
Clock pulse input method		External clock (input to pin XTI) or internal clock (a crystal oscillator inserted between pin XTI and XTO).			
Internal system clock pulse period	Tsys	tXI		2*tXI	

tXI stands for the XTI input clock pulse period.

Table 10–1 System clock frequency selection and internal system clock

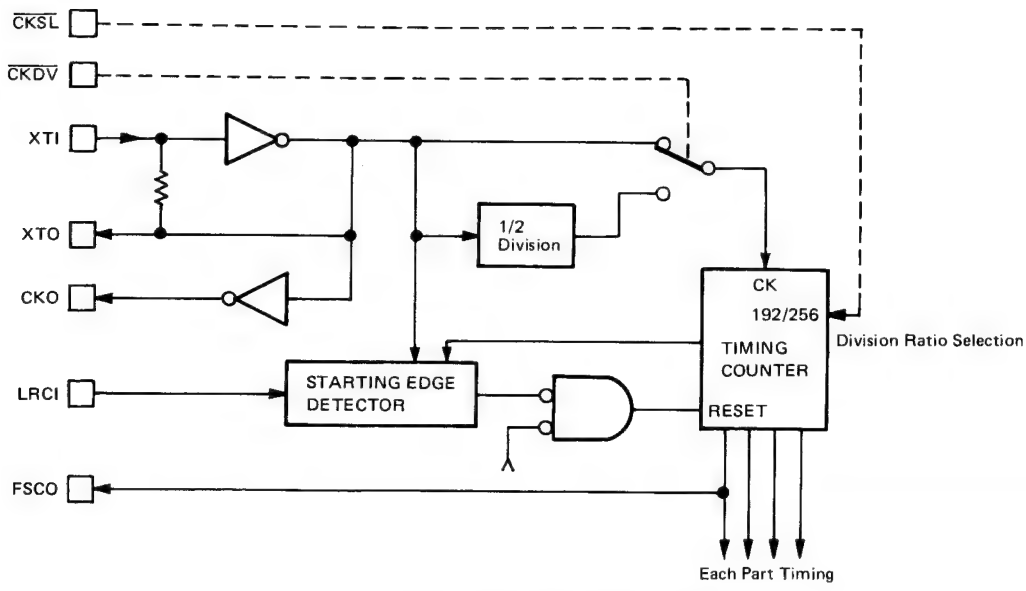


Fig. 10 Clock generation circuit

CIRCUIT DESCRIPTION

• Auto data input (DIN, BCKI, LRCI)

The input data is handled as being of 2's complement, MSB first. Each bit of the serial data input to pin DIN is read in to register SIPO (serial/parallel conversion register) a the leading edge of bit clock pulse BCKI, in which it is in turn converted into a parallel data. The output of SIPO is transferred to each of the Lch and Rch input registers at the trailing/leading edge of clock pulse LRCI.

In addition, the operation section and the output section are independent in signal timing from the input section and are therefore unsusceptible to the jitter of the input section. (Jitter-free mote: For details, refer to the description occurring later.)

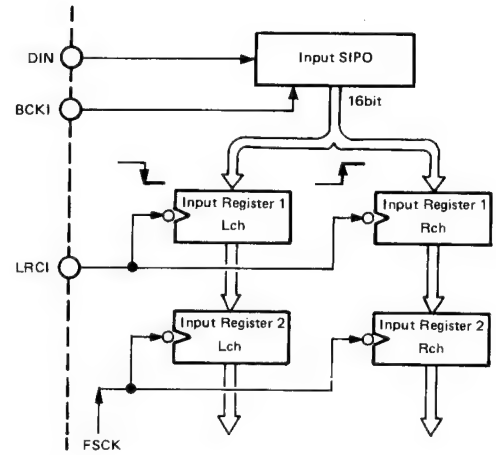
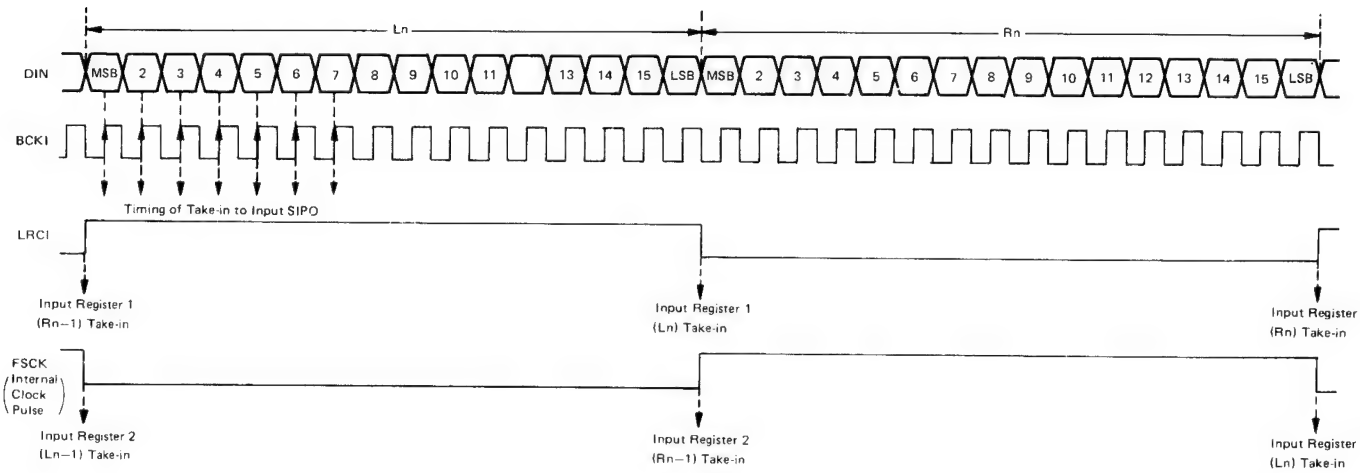


Fig. 11 Configuration of audio data input section



16bits right before LRCI edge is taken in as data.

Fig. 12 Audio data input timing example

• Selection between jitter-free mode and compulsory sync mode ($\overline{SYN}$, FSCO)

The signal timing (internal timing) applied to internal operation or output, that is produced from the system clock pulse (input to pin XTI), is independent from that of the data input section (BCKI, LRCI).

For this internal timing, the method of countering the jitter of clock pulse input LRCI is available in two types, "jitter-free mode" and "compulsory sync mode". Selection between these both is feasible by setting $\overline{SYN}$.

1) Jitter-free mode ($\overline{SYN}$="H")

As long as the phase difference between clock pulse LRCI and the internal timing is within +3/8 to −3/8 of the input sampling period (1/fs), the internal timing is not adjusted. Accordingly, even with a jitter component in clock pulse LRCI, the internal timing is not affected so that it is free from faulty operation or jitter transmission to output.

When the phase difference is without the above range, the internal timing is put in phase synchronously with the start side of clock pulse LRCI. More, this treatment is also performed when the reset input is given.

2) Compulsory sync mode ($\overline{SYN}$="L")

When this mode is engaged, the internal timing is always reset at a pulse edge of the start side of input LRCI. In this case, when a pulse period shorter than the specified system clock pulse period exists due to the jitter of input LRCI, a faulty operation may result.

Conversely, when a pulse period longer exists, the operation is properly made but no equal output timing is obtained.

3) Clock pulse FSCO (output)

This is a clock pulse with a period of fs obtained from the dividing process of clock pulse XTI.

CIRCUIT DESCRIPTION

• Data and DAC control signal output (DOL, DOR, BCKO, WCKO, DG, $\overline{COB}$, $\overline{OW18}$,$\overline{OW20}$)

1) Output data format

1) MSB first
2) 2's complement/COB (Complemented Offset Binary) selection ($\overline{COB}$)
   2's complement format ($\overline{COB}$="H")
   COB format ($\overline{COB}$="L")

2) Output data number-of-bits selection ($\overline{OW18}$, $\overline{OW20}$)

As to the number of bits for the output data, any of 16, 18 and 20-bit can be selected.

16-bit output ($\overline{OW18}$="H", $\overline{OW20}$="H")
18-bit output ($\overline{OW18}$="L", $\overline{OW20}$="H")
20-bit output ($\overline{OW18}$="H", $\overline{OW20}$="L")

However, this unit is set at the 18-bit output mode.

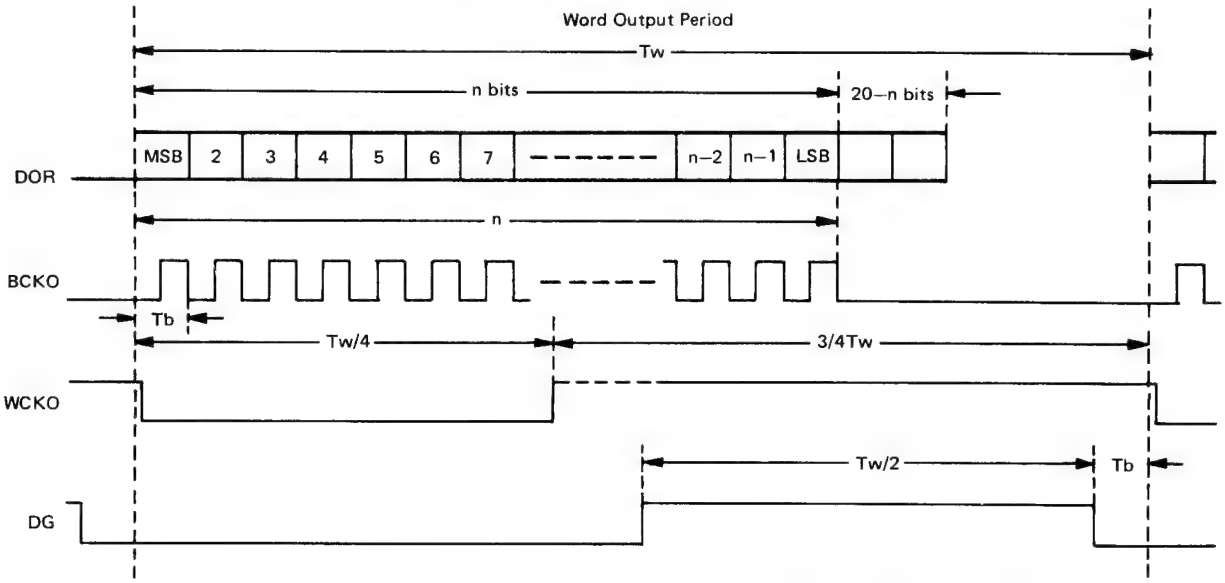
3) Output timing

The output timing of the audio output section is determined according to each internal system clock pulse frequency.

Item	Symbol in diagram	$\overline{CKSL}$	
		H	L
Internal system clock pulse frequency		192fs	256fs
Bit clock pulse period	Tb	Tsys	Tsys
Data word length	Tw	24*Tsys	32*Tsys

Tsys : internal clock pulse period (Refer to Table 10-1.)
Tb, Tw : serial output timing (Refer to Figure13 .)

Table 10–2 Output timing



Note : n means the number of output word bits.

Fig. 13 Output timing

• System reset ($\overline{RST}$)

When the reset input is made in the jitter-free mode, the internal operation timing is reset in synchronization with the leading edge of input LRCI. Making use of this, the output timing in the jitter-free mode can be aligned with input LRCI.

In the compulsory sync mode, no system reset is needed. Even in the jitter-free mode, the output timing does not need to be aligned with input LRCI and no system reset is necessary.

For system reset at power ON, externally connect a capacity of around 100pF to pin $\overline{RST}$. (Figure14)

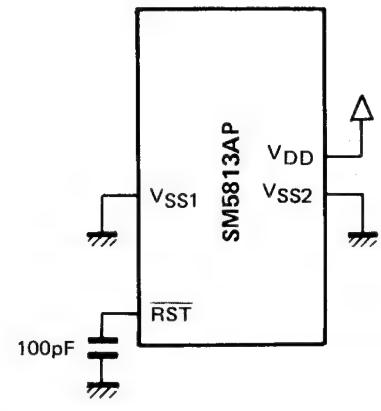
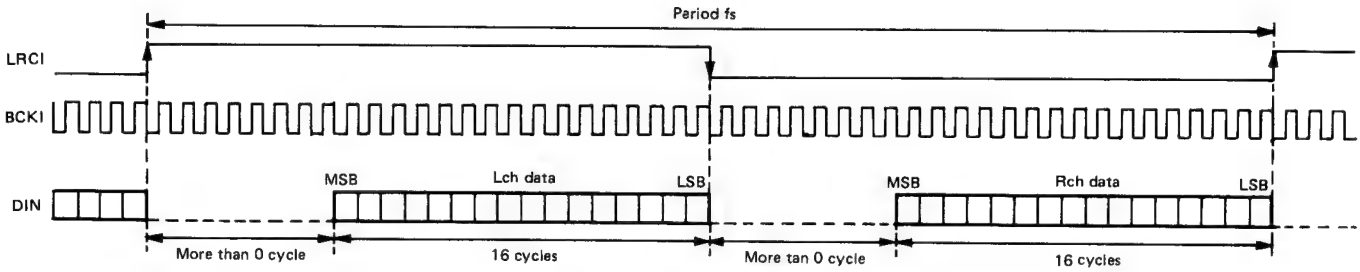


Fig. 14 Circuit example of system reset at power ON

CIRCUIT DESCRIPTION

10–9. Timing chart

- **Serial input timing (DIN, BCKI, LRCI)**



Note : BCKI should have 18 cycles or more for one word.

Fig. 15 Serial input timing

- **Serial output timing (DOL, DOR, BCKO, WCKO, DG)**

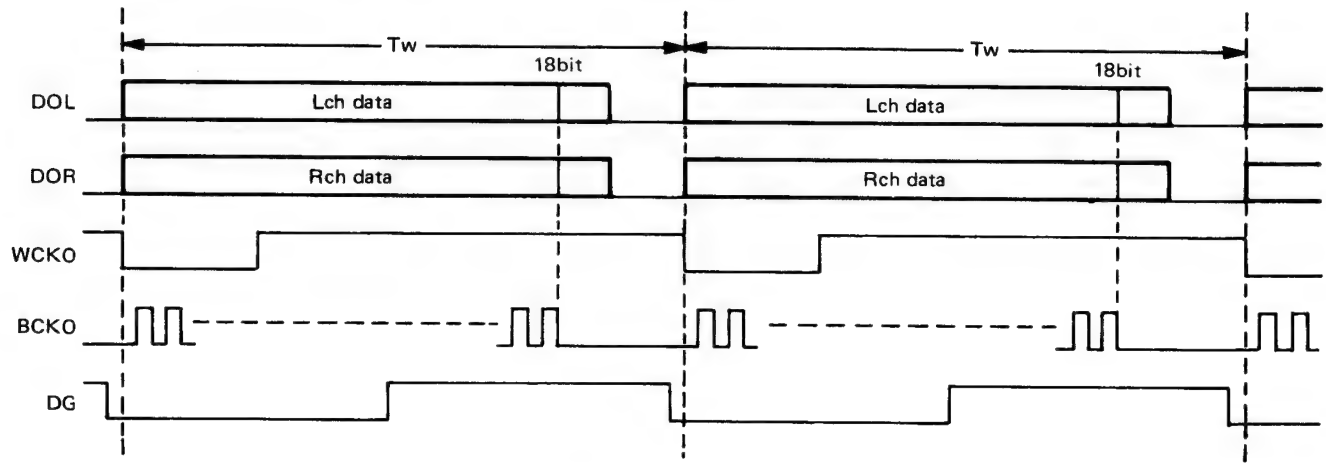
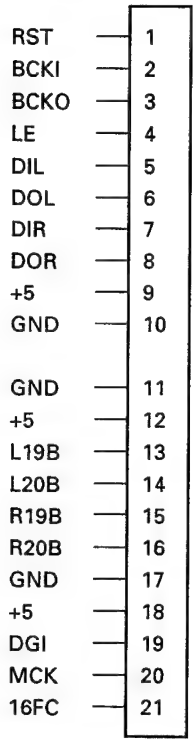


Fig. 16 Serial output timing

CIRCUIT DESCRIPTION

11. D.P.A.C IC KAG01(X32-1500-22 : IC13)

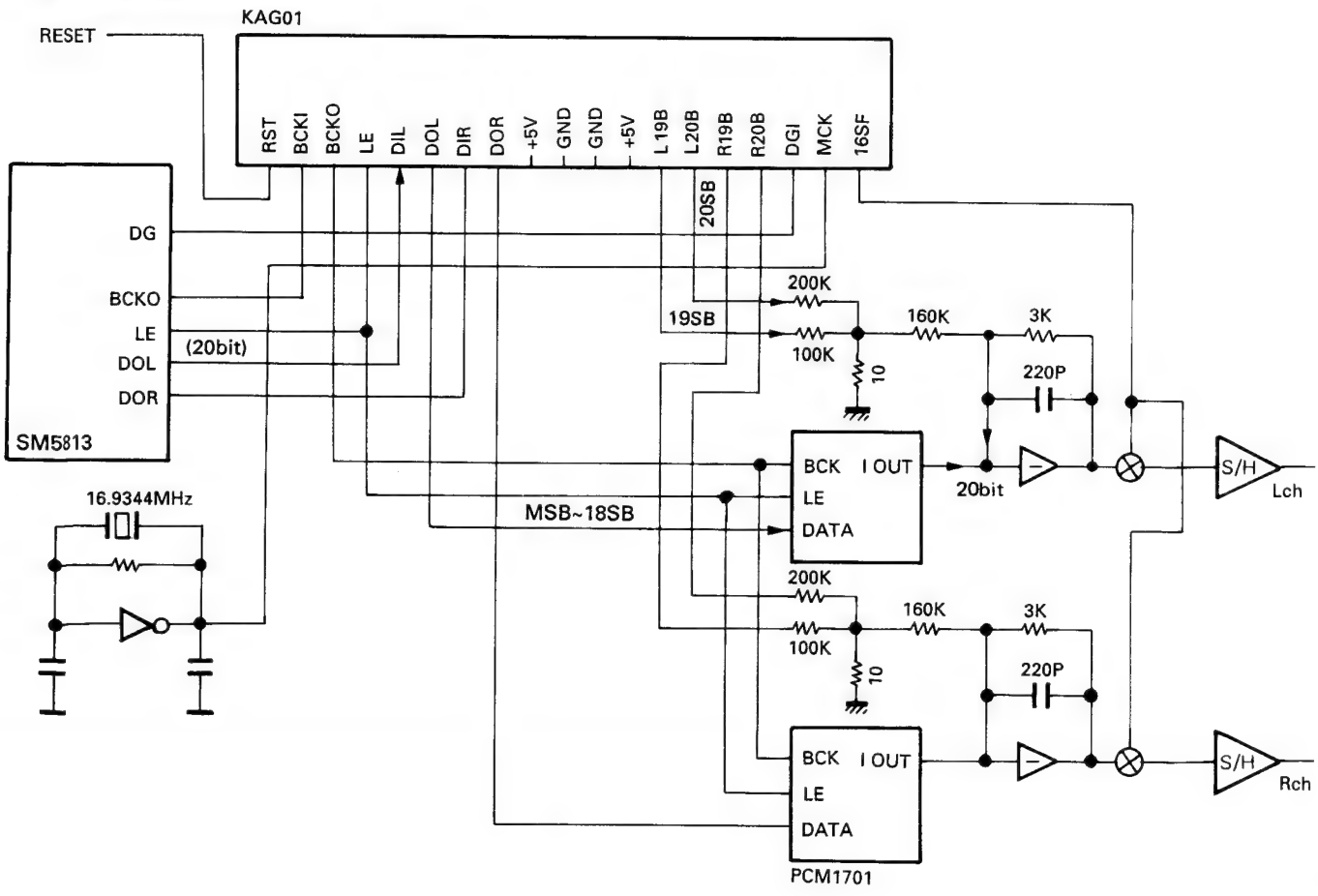
11-1. Terminal connection diagram



11-2. Explanations of terminals

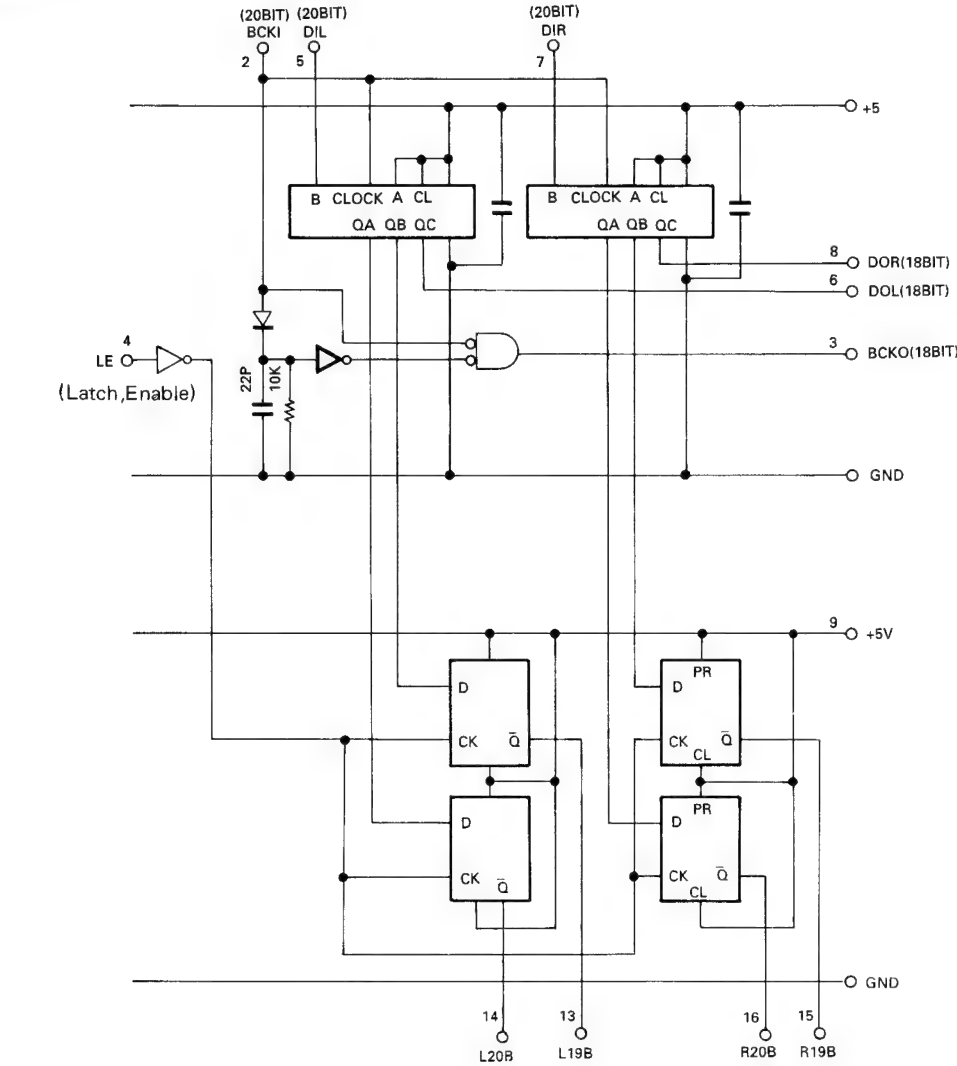
Pin NO.	Pin Name	Function
1	RST	Reset input.
2	BCKI	Bit, Clock input (20bit).
3	BCKO	Bit, Clock output (18bit).
4	LE	Latch, Enable.
5	DIL	L-ch data input (20bit).
6	DOL	L-ch data output (18bit).
7	DIR	R-ch data input.
8	DOR	R-ch data output.
9	+5	
10,11	GND	
12	+5	
13	L19B	L-ch 19bit Data output. (complement output)
14	L20B	L-ch 20bit Data output. (complement output)
15	R19B	R-ch 19bit Data output. (complement output)
16	R20B	R-ch 20bit Data output. (complement output)
17	GND	
18	+5	
19	DGI	Input of D-guritch output of digitaifilter.
20	MCK	16.9344MHz input.
21	16FS	16x D-guritch output.

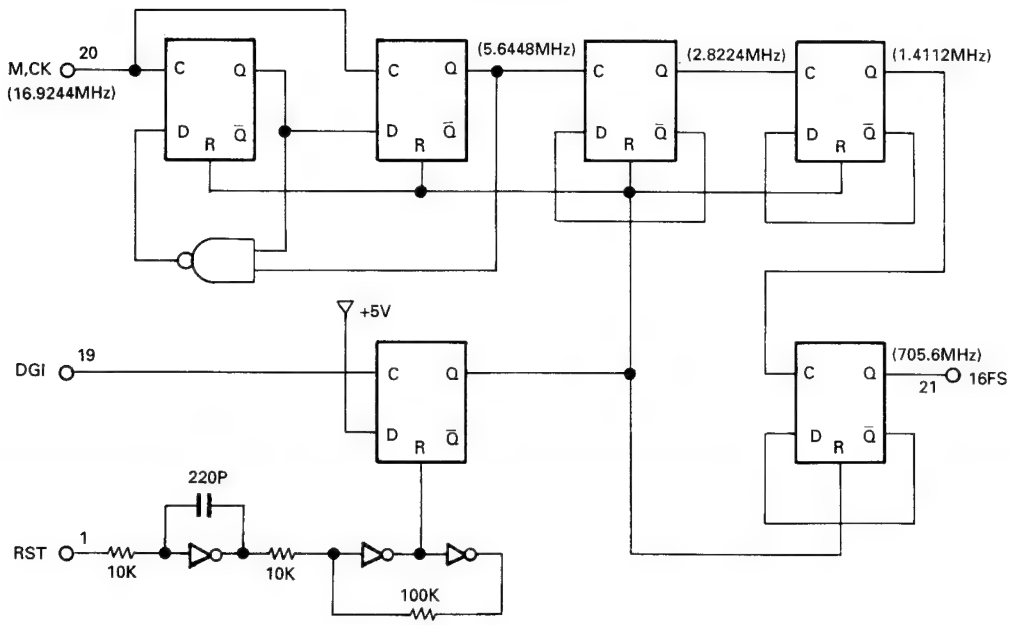
11-3. Block diagram



CIRCUIT DESCRIPTION

11-4. Block diagram





CIRCUIT DESCRIPTION

• TBC function

The write data clock pulse (WFS) and the read data clock pulse (RFS) are independent in operation from each other. Thus, the jitter margin ranges ±1 clock pulse widths.

For 2MSB detection, the level (2's complement) of the 2MLSB detection value at playback is output for both Lch and Rch.

Figure 17 shows the I/O waveforms in use of each digital filter.

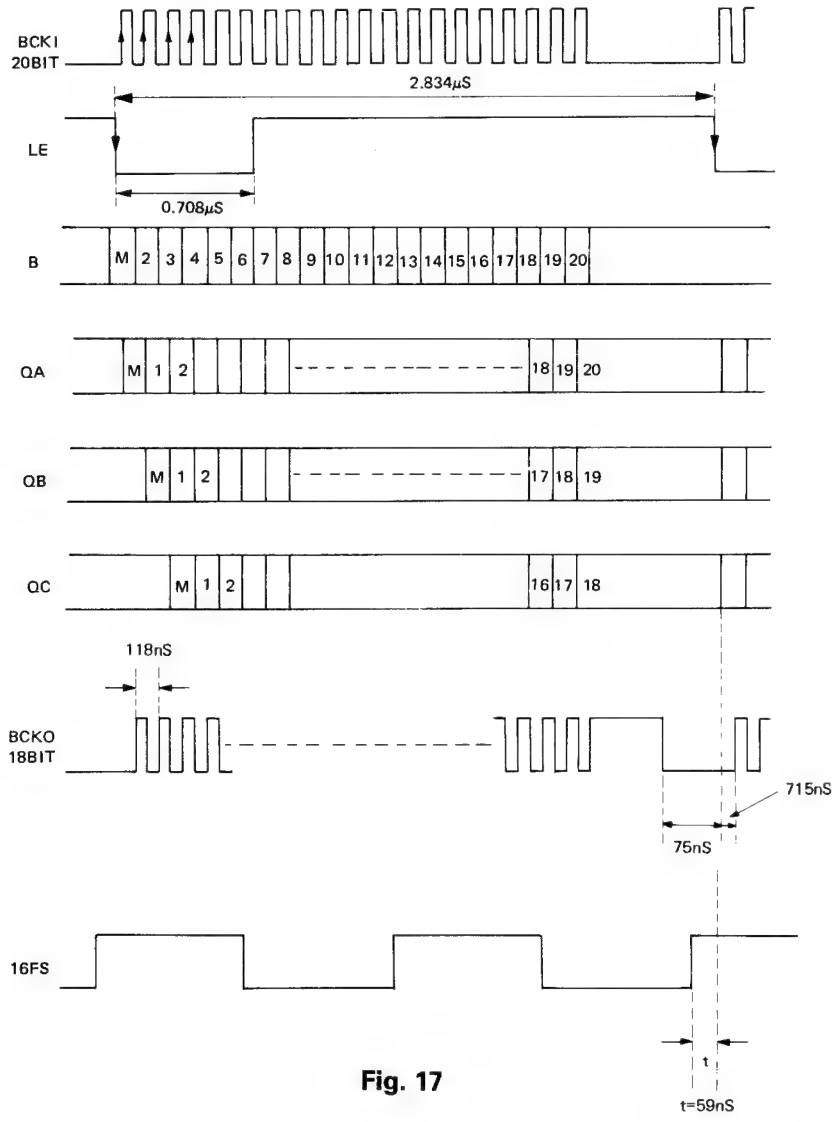


Fig. 17

• PLL function

Since the phase comparator is of a well-known system, its description is not made here.

For the counter setting of the divider, the type of the input clock pulse, LPF and VCXO circuit configuration, etc., refer to "11-2 Block diagram" and "11-3 Pin functions".

• Digital filter mode setting

Only two modes are available, 16-bit and 18-bit modes. This unit is set at the 18-bit mode.

The mode change is performed at the time of muting. The status right before the cancel of muting is held.

MECHANISM OPERATION DESCRIPTION

Figure 1 illustrates the positional relationship of the mechanism in the STOP mode. The position of each switch with the tray closed is as follows:

S1	Clamp UP switch	OFF
S2	Tray CLOSE switch	ON
S3	Clamp END switch	ON
S4	Tray OPEN switch	OFF

Note: The figure in ( ) following a parts name occurring in the drawing below is the same as in the exploded view of the service manual.

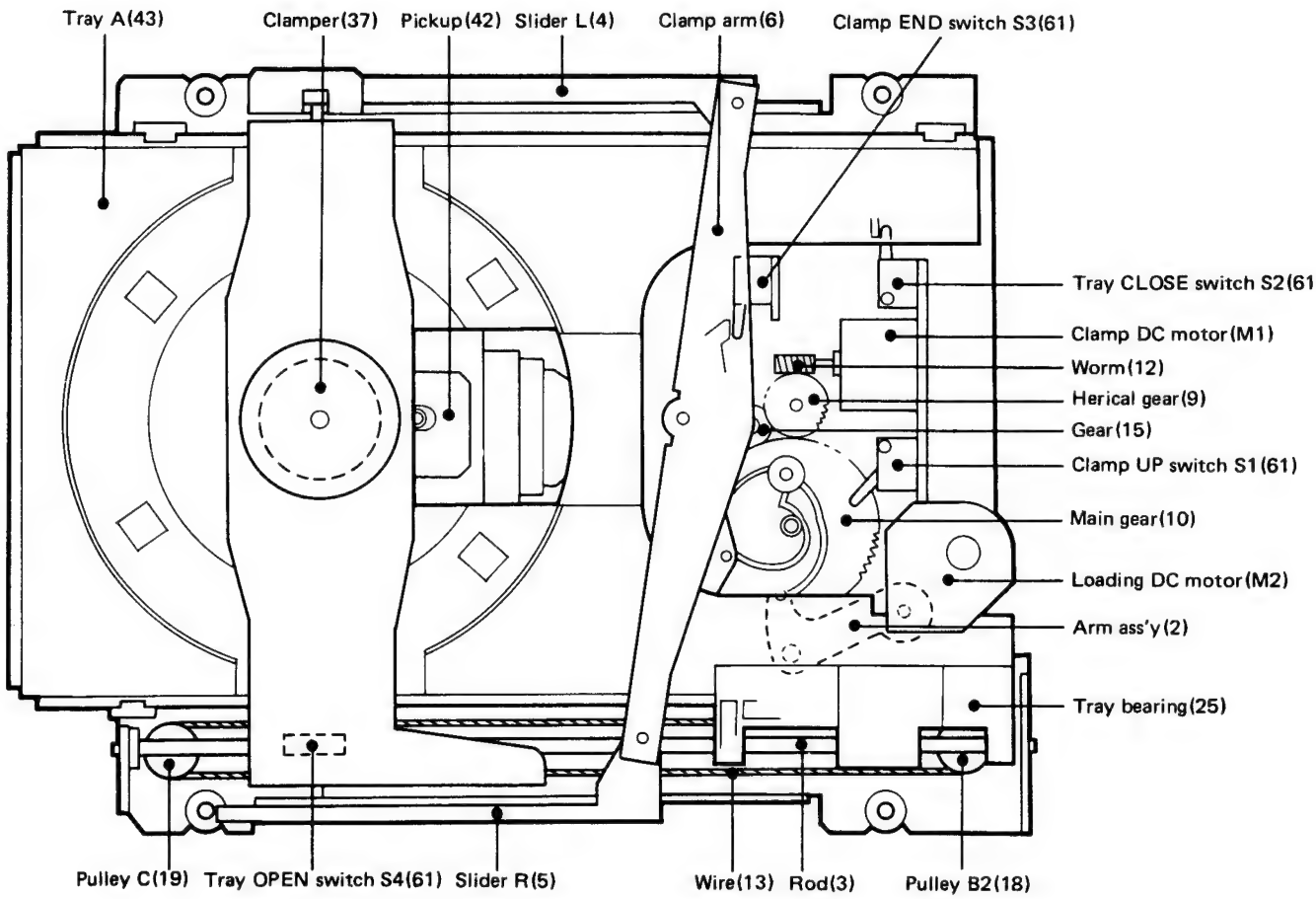


Fig. 1 Tray CLOSE status (as viewed perspectively from above)

MECHANISM OPERATION DESCRIPTION

1. Tray OPEN operation

When the OPEN/CLOSE key is pressed, an "H" signal is output from the microprocessor.

At first, the clamp DC motor (M1) thus rotates in the direction of arrow (❶). Further, the main gear rotates in the direction of arrow (❷) by an intermediate gear (Figure 2).

A groove as shown in Figures 3 and 4 exists in the lower side of the main gear. The arm ass'y moves along this groove to control the tray OPEN/CLOSE operation (Figure 3).

Figure 4 shows the position of the main gear with the tray opened.

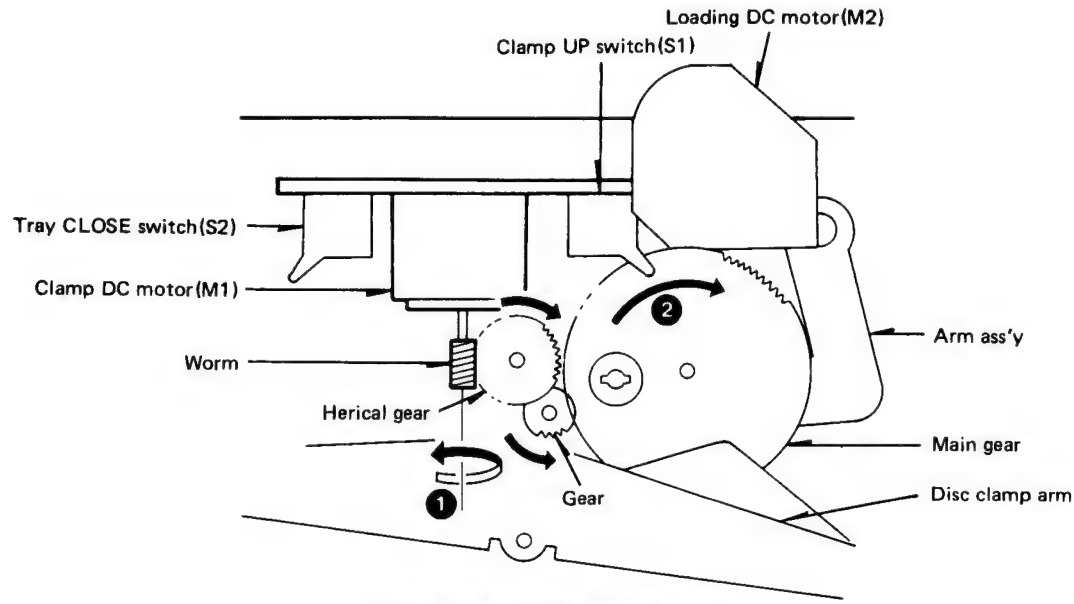


Fig. 2 Tray OPEN operation (1)

Due to the rotation in the direction of the arrow, the position of the arm ass'y moves in the direction of the broken line and comes to the location as shown in Fig.4. (At CLOSE, it moves in the reverse direction.)

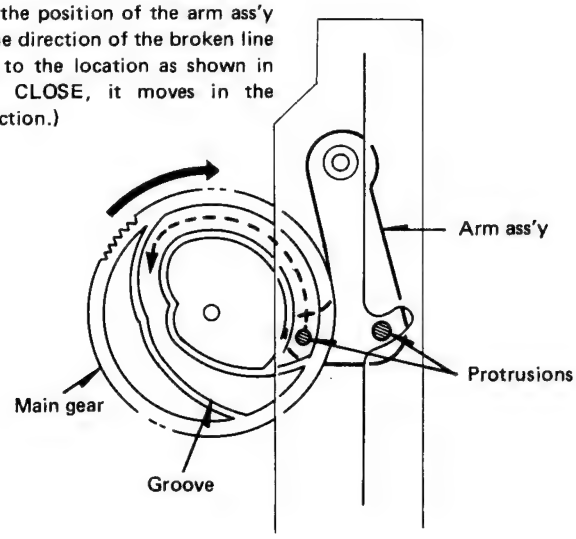


Fig. 3 Positional relationship between arm ass'y and main gear with tray closed (as viewed perspectively from above the main gear)

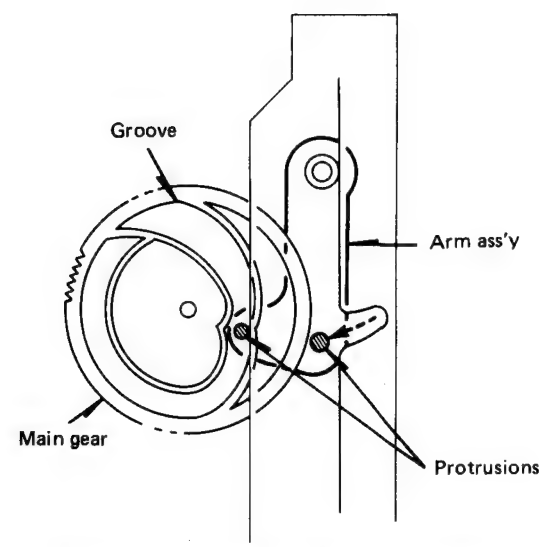


Fig. 4 Rear of main gear when tray opens

MECHANISM OPERATION DESCRIPTION

A similar groove is given in the upper side of the main gear. Along this groove, control is made over the clamp switch and the clamp mechanism. From the positional status with the tray closed as shown in Figure 3, when the clamp DC motor (M1) rotates in the direction of an arrow as indicated before, the protrusion placed at the lower side of the disc clamp arm is led in the direction of arrow (❸) along the groove of the main gear. Thereby, the disc clamp arm is rotated in the direction of arrow (❹) (Figure 5).

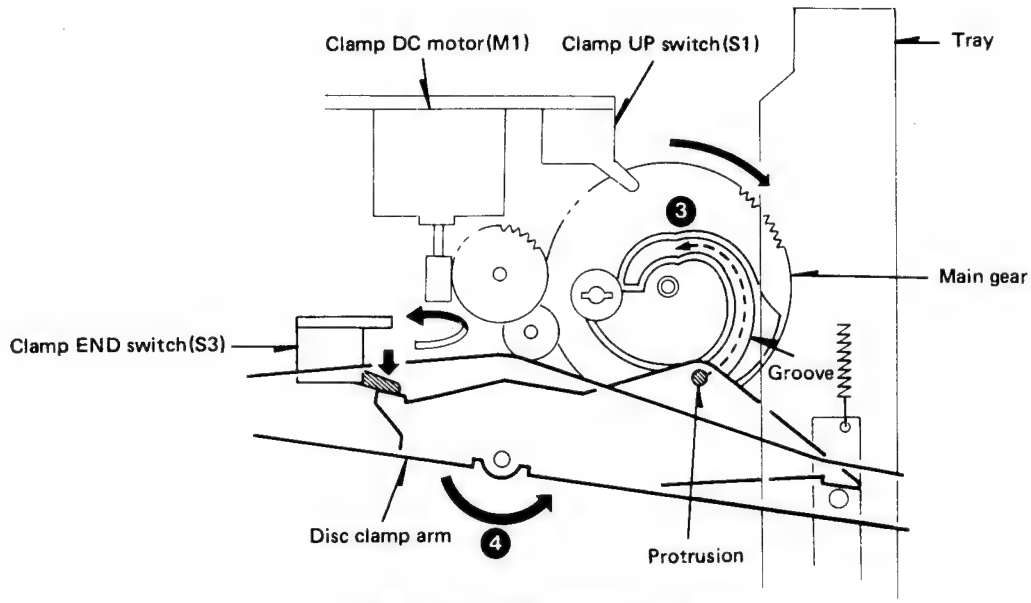


Fig. 5 Tray OPEN operation (2)

In addition, the top ends of the disc clamp arm are moved in the direction of arrows (❺) in response to the slider mechanism in order to raise and lower the disc clamper (Figure 6).

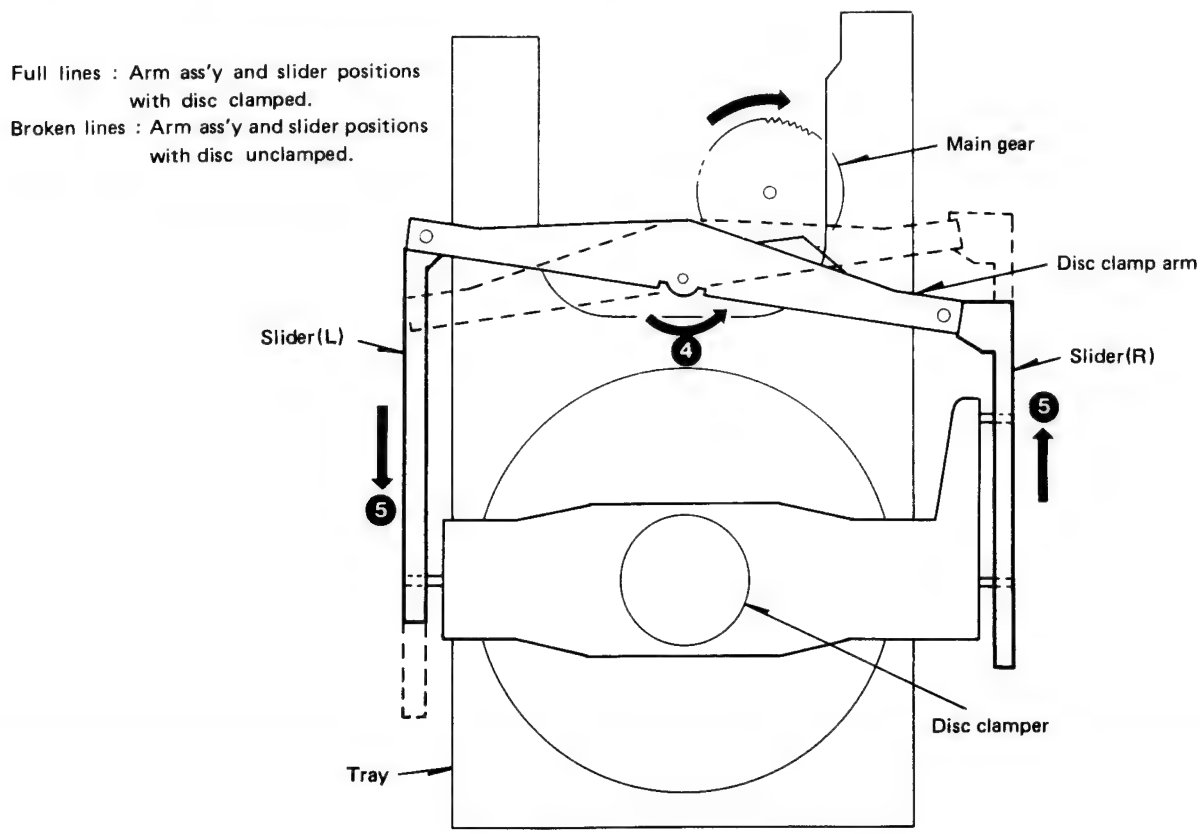


Fig. 6 Tray clamper UP/DOWN operation (1)

MECHANISM OPERATION DESCRIPTION

At this time, the tray is raised and lowered by the bent portion at the right lower side of the disc clamp arm. Figures 8 and 9 are the illustration on the process that the disc clamp arm moves in the direction of arrow (❹), the protrusion of the tray is released backwards by a spring and the tray rises entirely.

The left and right sliders are provided with slits as shown Figure 7, along which the left and right pins attached to the disc clamp arm slide up to unclamp. At this time, the disc clamp arm with the disc clamper fully raised is positioned with its left side down as opposed to the previous clamp position. (Figures 6, 7 and 8)

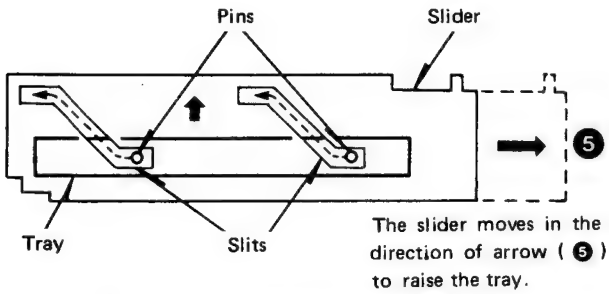
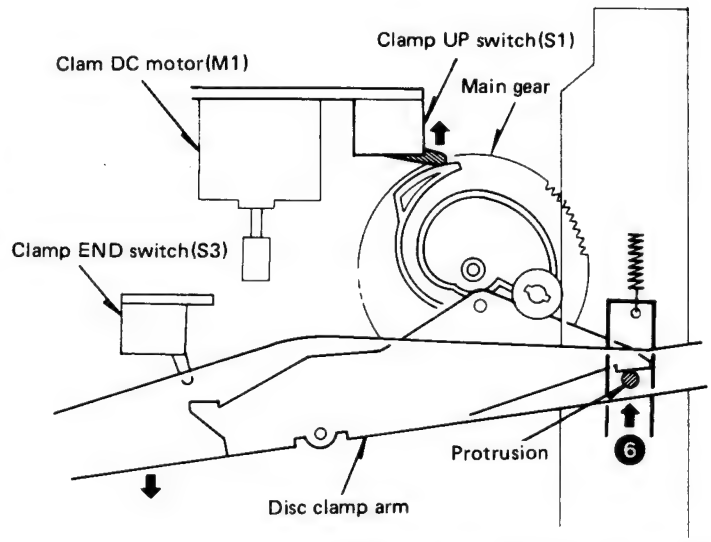


Fig. 7 Tray clamp UP/DOWN operation (2) (Side slider section)



Normally, when the disc is clamped, the spring is expanded. Thus, it moves in the direction of arrow (❻) with the arm movement.

Fig. 8 Clamp UP switch (S1) ON and unclamping

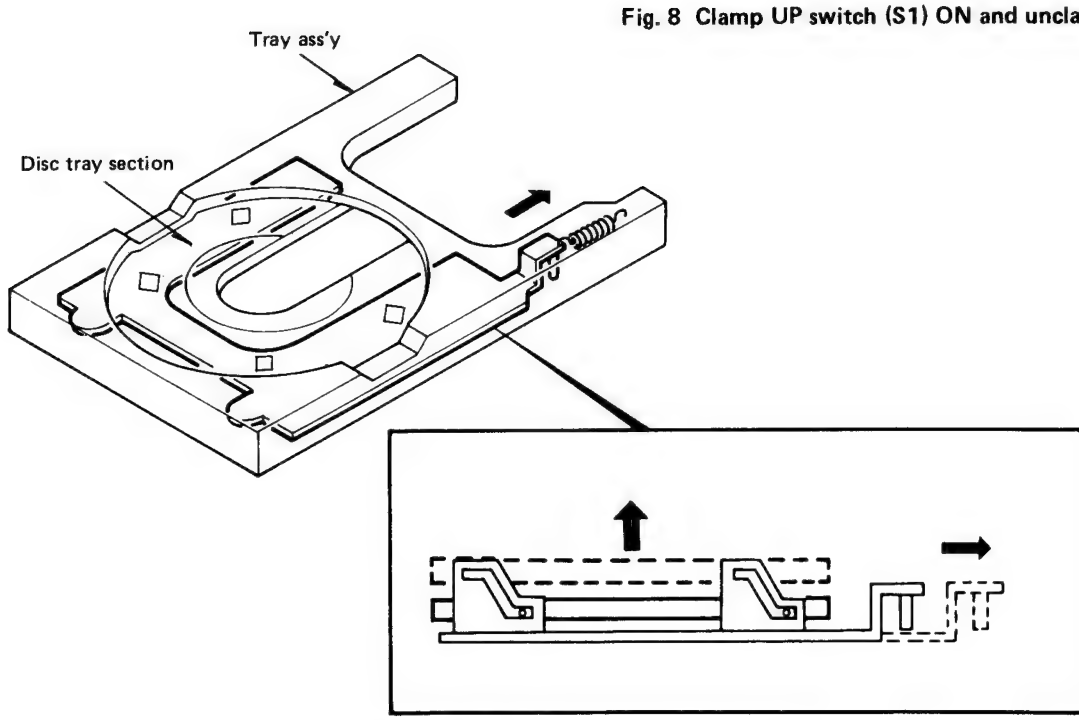


Fig. 9 Disc tray section UP/DOWN operation

MECHANISM OPERATION DESCRIPTION

Subsequently, S1 (clamper UP switch) turns ON by the groove at the upper side of the main gear, and the loading DC motor (M2) rotates in the direction of arrow (❼) to pull the wire via the belt (Figure 10).

As shown in Figure 11, a foot is given under the tray bearing by which the tray is installed to the rod. This foot works to turn ON/OFF S4 (tray OPEN switch). The loading DC motor (M2) rotates until S4 is turned ON by this foot to open the tray.

Note: The tray CLOSE operation is reverse to the tray OPEN operation in respect to the operational sequence. Therefore, the description of the tray CLOSE operation is here omitted.

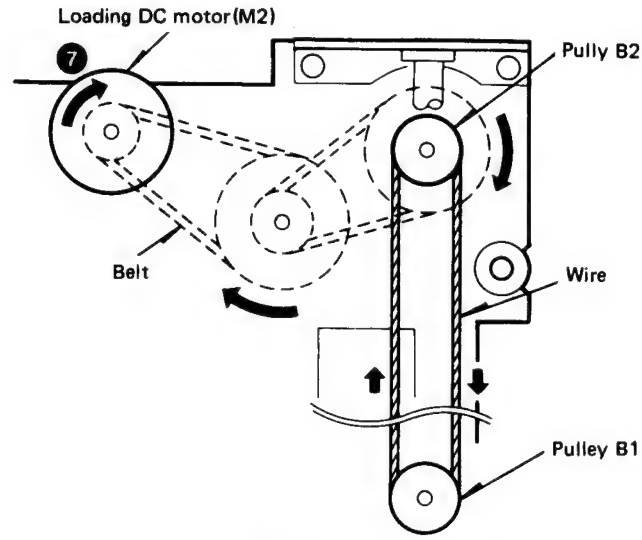


Fig. 10 Tray OPEN operation (3)

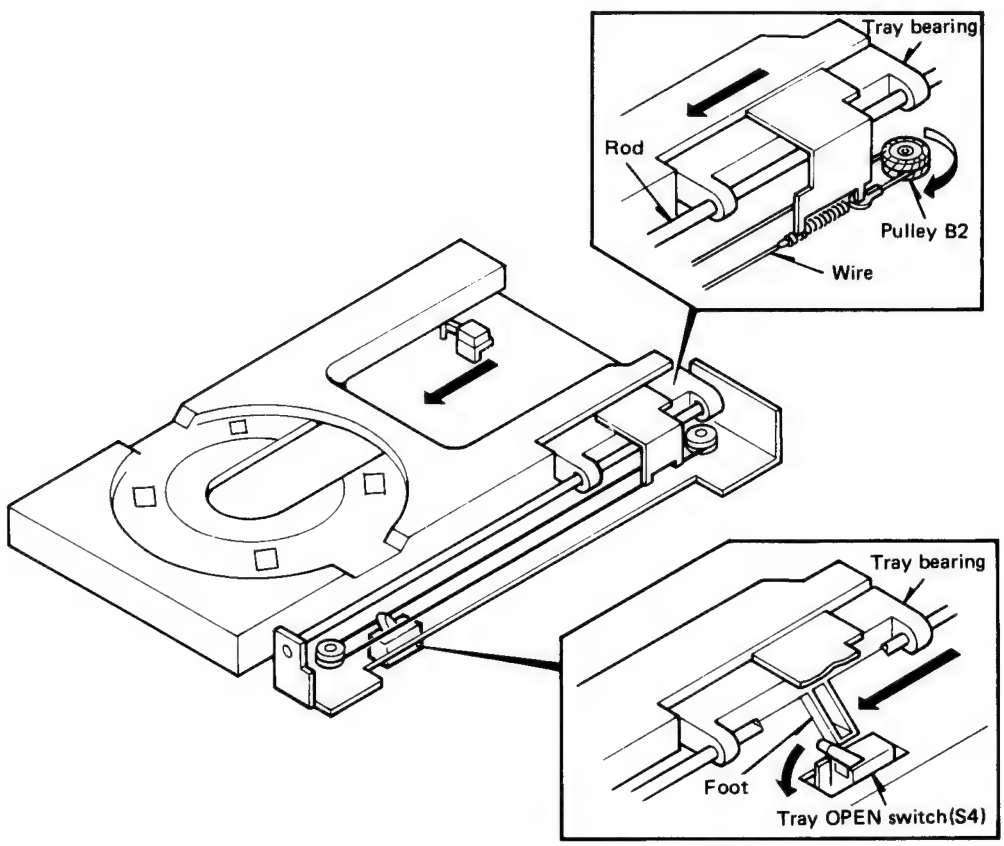


Fig. 11 Tray OPEN operation (4)

ADJUSTMENT

No.	ITEM	INPUT SETTING	OUTPUT SETTING	PLAYER SETTING	ALIGNMENT POINT	ALIGN FOR	FIG
1	LASER POWER	–	Apply the sensor section of the optical power meter on the pickup lens.	Short-circuit pins TEST and turn the power on to enter the test mode. Press the MANUAL S. key(⏭)to move the pickup outwards. Press the CHECK key to check that the LD emits light. Then, confirm that the display is" 03 ".	–	On the power from 0.1 to 0.3mW, when the diffraction grating is correctly aligned with the RF level of 1.0Vp-p or more and the TE (servo open) level of 1.0Vp-p or more, the pickup is acceptable.	(a)
2	VCO	–	Connect a frequency counter to PLCK . (X32-1500)	Press the STOP key. and confirm that the display is "01".	L4 (X32-1500)	4.30MHz	(b)
3	TRACKING ERROR BALANCE	Test disc Type 4	Connect an oscilloscope as follows. CH1: RF (X32-1500 RF) CH2: TE (X32-1500 TP3)	Press the REPEAT key to open the tray. Load a disc and close the tray by pushing it by hand. Then,press the CHECK key. Confirm that the display is"03".	TE BALANCE VR104 (X32-1500)	Symmetry between upper and lower patterns, or DC=0±0.05V	(c)
4	FOCUS ERROR BALANCE	Test disc Type 4	Connect an oscilloscope as follows. CH1: RF (X32-1500 RF) CH2: TE (X32-1500 TP3)	Press the PLAY key. Confirm that the display is" 05 ".	FE BALANCE VR103 (X32-1500) Test disc	Optimum eyepattern	(d)
5	FOCUS GAIN	Test disc Type 4 Apply signal of 800Hz, 50mVrms to CN10 pin 1-2. (X32-1500)	Connect an LPF to CN10 pin 1-2,to which connect an oscilloscope or an AC voltmeter. (X32-1500)	Press the PLAY key. Confirm that the display is" 05 ".	FOCUS GAIN VR101 (X32-1500)	Two VTVMs should read the same value. 50mVrms	(e)
6	TRACKING GAIN	Test disc Type 4 Apply signal of 1.0kHz, 50mVrms to CN10 pin 4-5 (X32-1500)	Connect an LPF to CN10 pin 4-5,to which connect an oscilloscope or an AC voltmeter. (X32-1500)	Press the PLAY key. Confirm that the display is" 05 " .	TRACKING GAIN VR102 (X32-1500)	Twe VTVMs should read the same value. 50mVrms	(e)
7	DAC DISTORTION (MSB)	Test disc Type 4	Connect an distortion meter to the output terminal(FIXED).	Play the 1kHz, -20dB signal in track No.15	VR1:L VR2:R (X32-1500)	Minimum distortion	(f)
8	DAC DISTORTION (2SB)	Test disc Type 4	Connect an distortion meter to the output terminal(FIXED).	Play the 100Hz, 0dB signal in track No.4.	VR3:L VR4:R (X32-1500)	Minimum distortion	(f)
9	DAC DISTORTION (3SB)	Test disc Type 4	Connect an distortion meter to the output terminal(FIXED).	Play the 100Hz, 0dB signal in track No.4.	VR5:L VR6:R (X32-1500)	Minimum distortion	(f)

(Note) Type 4 disc: SONY YEDS-18 Test Disc or equivalent.
LPF: Around 47kΩ+390pF or so.
Step 1~6 are TEST mode.
If adjust step 7 or 8,should readjust stops 7 and 8.

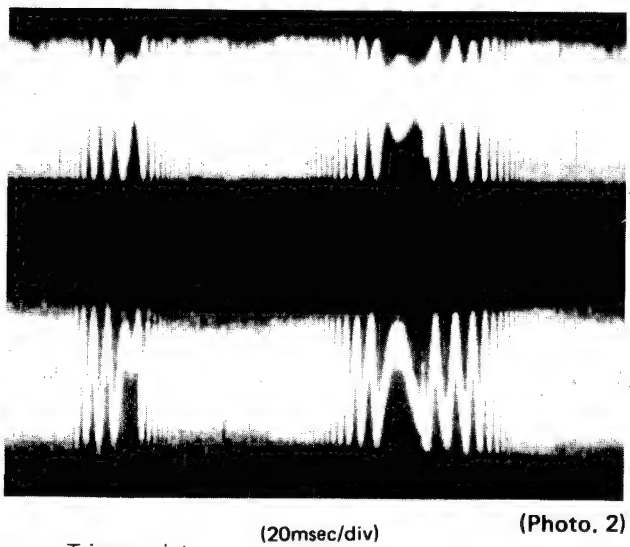
DP-8020(K)

ADJUSTMENT

DIFFRACTION GRID ADJUSTMENT

(Photo. 1)

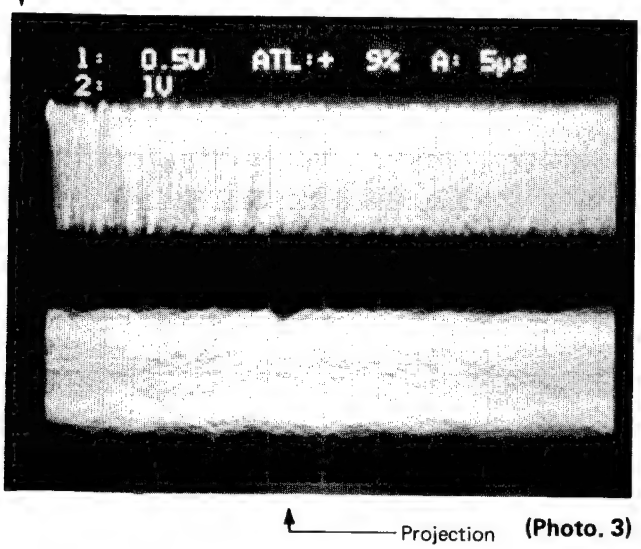
- RF signal and T.Error signal after diffraction grating adjustment.



(Photo. 2)

- RF signal and T.Error signal when there is small diffraction grating position error.
- The T.Error signal level is small, and the envelope is as shown in the diagram below.

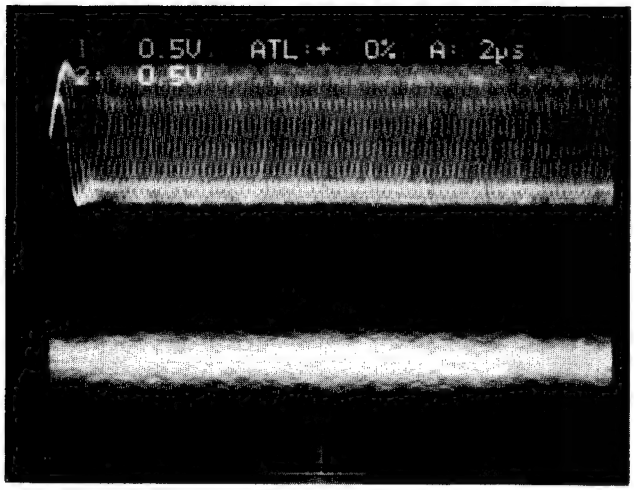
Trigger point



(Photo. 3)

- RF signal and T.Error signal in test mode (with focusing ON).
- When the sub-beam traces the same bit series as the main beam during diffraction grating adjustment, bringing the RF trigger point to the position shown in the Photo causes a "projection" to be observies in the T.Error waveform.

ADJUSTMENT



CH1 RF
0.5V/div

CH2 E.Spot
0.1V/div

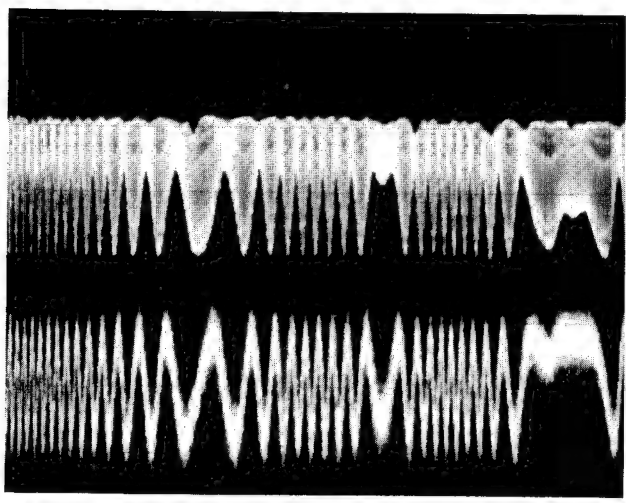
AC coupling for
CH2 only

(2μsec/div)

Projection

(Photo. 4)

- RF signal and E.Spot signal in test mode (PLAY).
- If the diffraction grating has been adjusted properly, the influence of triggering is observed on the E.Spot waveform of approx. 20μs after RF signal, in the form of a projection.



CH1 RF
1.0V/div

←0(V)

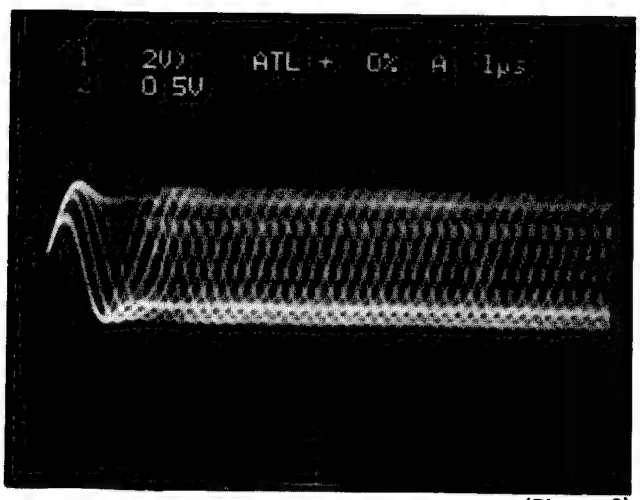
CH2 T.Error
2.0V/div

←0(V)

(20msec/div)

(Photo. 5)

- RF signal and T.Error signal; in test mode (Focusing ON). (Disc type 4)
- Adjust T.Error so that the waveform is symmetrical above and below 0V. (VR104 of X32-1500)



RF signal
0.5V/div

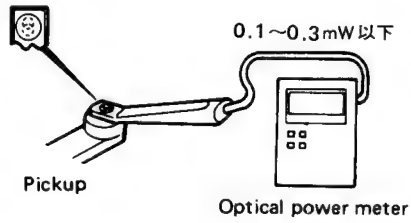
(Photo. 6)

(1μsec/div)

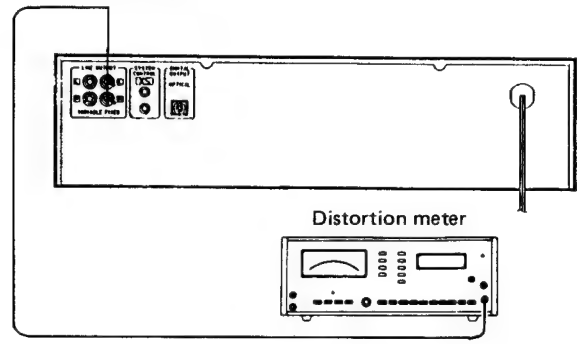
- RF signal in test mode (PLAY).
- Perform the tangential and focusing offset adjustments so that each of the center cross points are focused into one point on the display. The crossing points above and below the center shall also be displayed clearly.

ADJUSTMENT

(a) Laser Power



(f) DAC Distortion

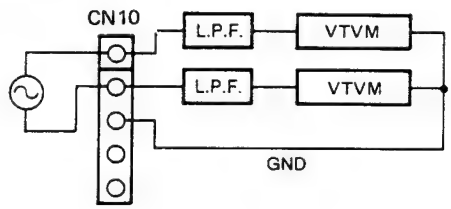


(e) Focus Gain and Tracking Gain

FOCUS GAIN

Two VTVMs should read the same value. 0dB (±50m Vrms)

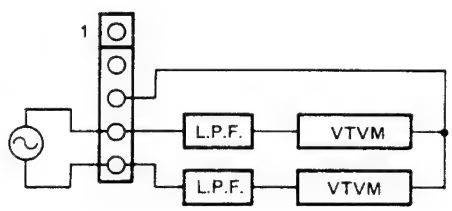
50mV 800Hz

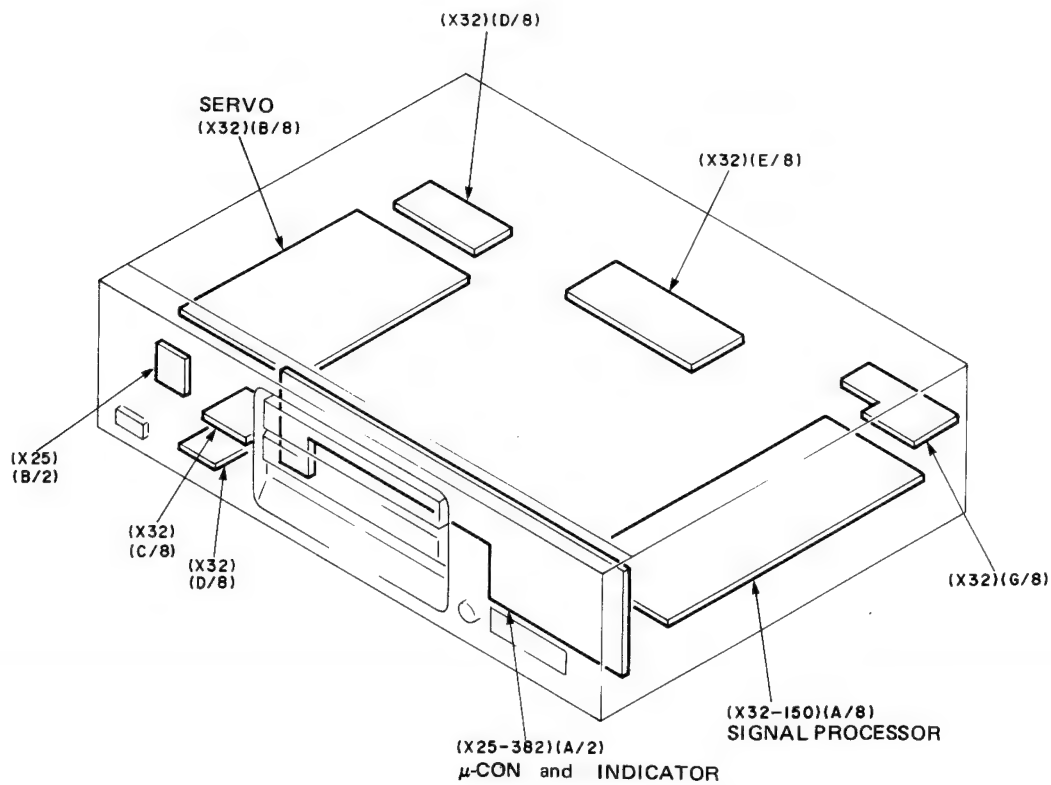


TRACKING GAIN

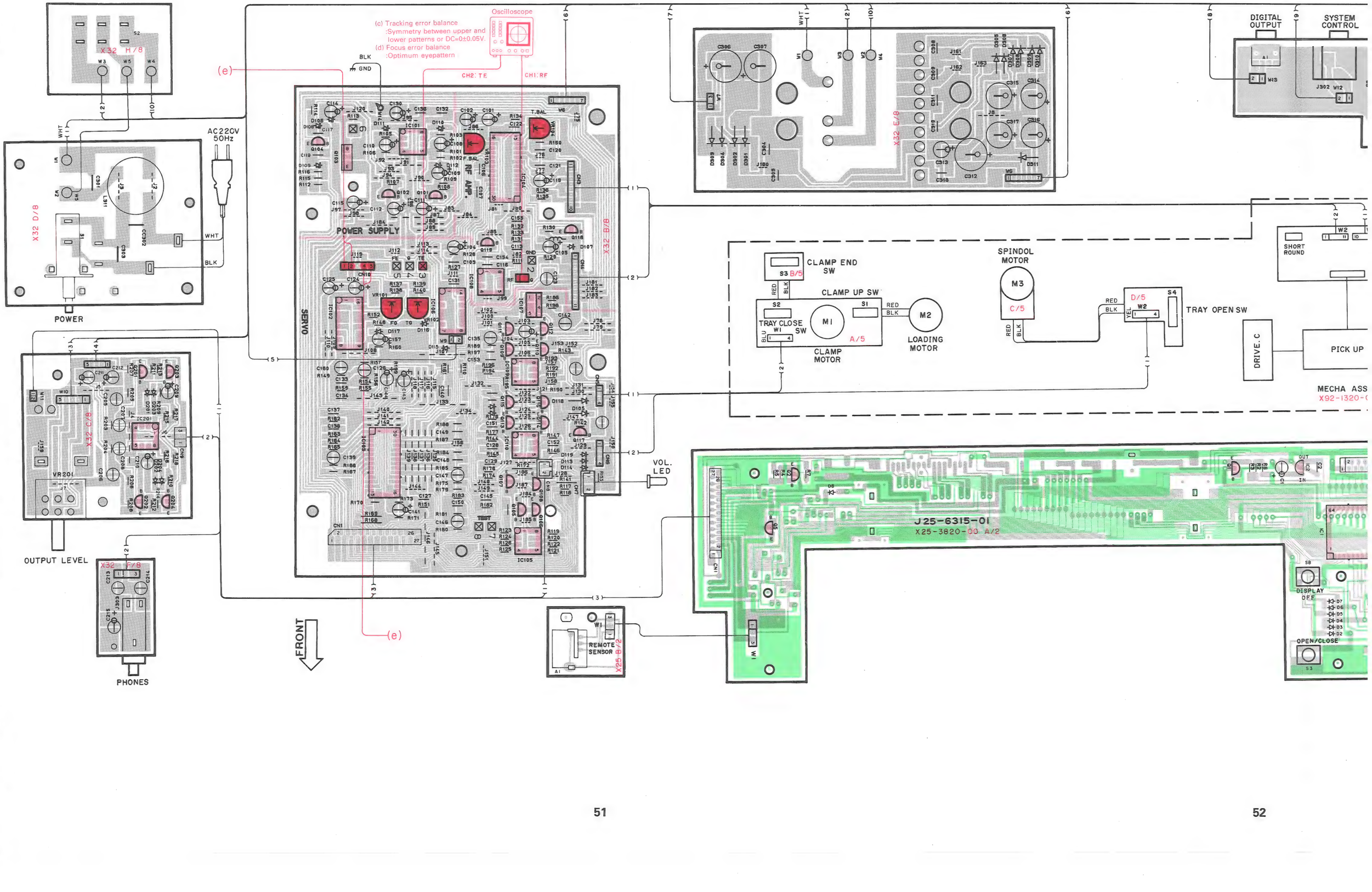
Two VTVMs should read the same value. 0dB (±50m Vrms)

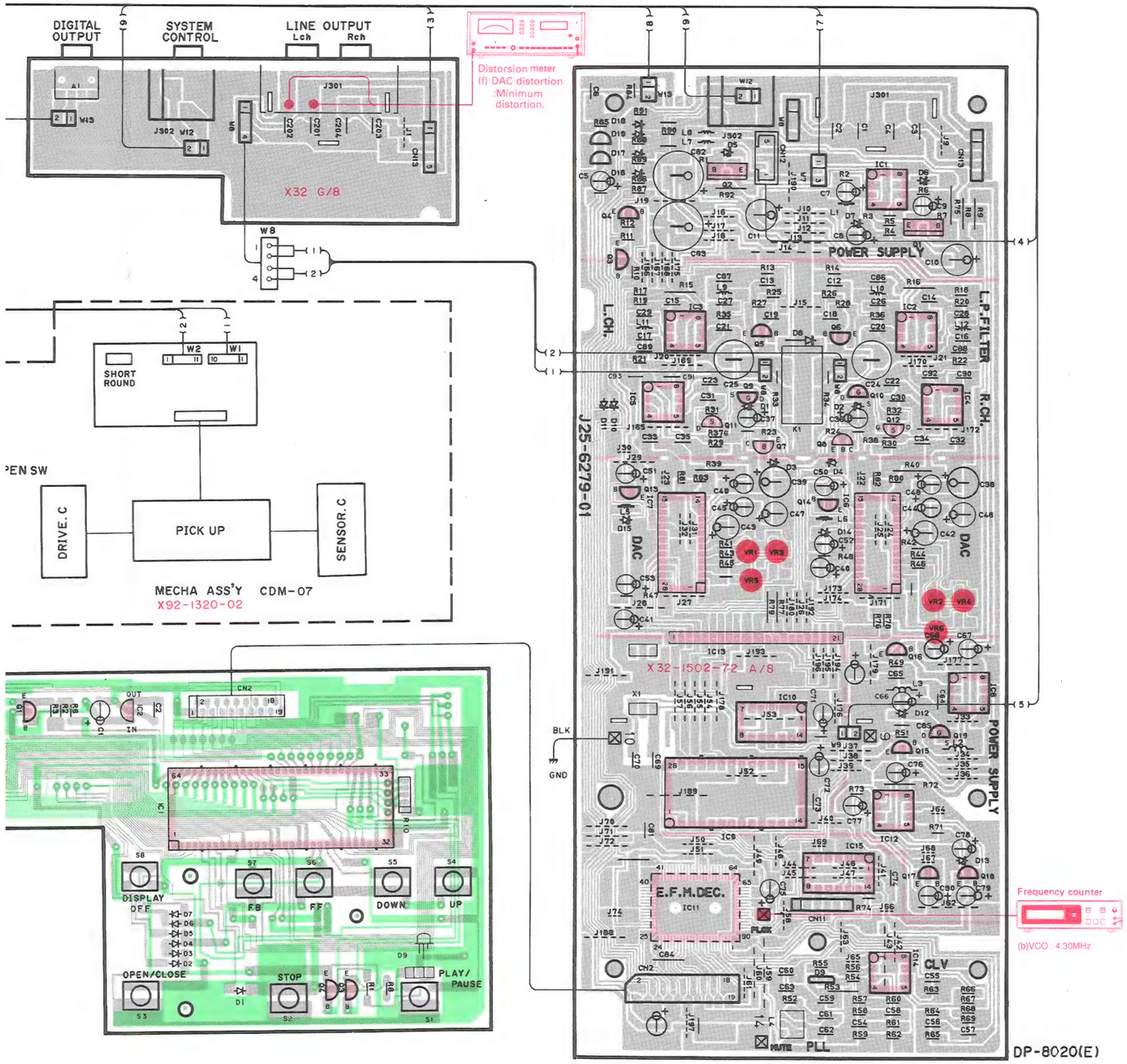
50mV 1.0kHz





PC BOARD (COMPONENT SIDE VIEW)





(X32-1500-22)

IC1

1	−2.6V
2,3	0V
4	−16.2V
5,6	5.6V
7	2.0V
8	15.6V

IC2,3

1~3	0V
4	−10.4V
5~7	0V
8	10.5V

IC4

2,3	0V
4	−10.4V
5~7	0V
8	10.5V

IC5

1~3	0V
4	−10.4V
5~7	0V
8	10.5V

IC6,7

1,2	0V
3	−9.5V
4	−9.6V
5,6	−9.7V
7(IC6)	−9.0V
7(IC7)	9.0V
8	1.7V
9	5.0V
10	−4.3V
11	3.3V
12~18	0V
19	5.0V
20~22	1.0V
23	3.3V
24	3.0V
25	4.0V
26	0V
27(IC6)	−11.0V
27(IC7)	11.0V
28	0V

C8

1	5.6V
2,3	5.0V
4	−10.5V
5,6	5.0V
7	5.6V
8	9.0V

IC9

1	0V(2.8V)
2	3.4V
3	5.0V
4,5	0V
6	3.2V
7	2.7V
8	0V
9	3.1V
10~13	0V
14,15	5.0V
16	0V
17	5.0V
18,19	0V
20	2.9V
21	0V
22	5.0V
23,24	0V
25	4.0V
26	2.8V
27,28	2.5V

IC10

1~6	3.3V
7	0V
8	3.3V
9	2.8V
10~13	3.3V
14	5.0V

C11

1	0V	34~40	0V
2	0V(5.0V)	51	3.3V
3	0V(2.5V)	52	0V
4	0V(2.8V)	53	3.1V
5	0V(3.0V)	54	2.3V
6	0V(2.9V)	55,56	0V
7	0V(5.0V)	57	5.0V
8	2.4V	58,59	0V
9	3.3V	65,66	1.9V(0V)
10	0V	67	5.0V(0V)
11	2.5V	68	1.0V(2.5V)
12	0V	69	2.5V
13~16	5.0V	70	3.3V
17	0V	71	5.0V
18,19	0V(0.5V)	72	5.0V(0V)
20~24	0V	73	5.0V
25	2.5V	74	5.0V(0V)
26	0V	75	2.6V
27	3.1V	76,77	3.2V
28~32	0V	78	0V
33	5.0V	79,80	2.5V

IC12

1	−5.6V
2,3	0V
4	−10.5V
5,6	5.0V
7	5.7V
8	9.0V

IC13

1	5.0V
2	2.8V
3	3.1
4	4.0V
5~8	0V
9	5.0V
10,11	0V
12	5.0V
13	3.8V
14	5.0V(3.8V)
15	3.8V
16	5.0V(3.8V)
17	0V
18	5.0V
19	4.0V
20	3.3V
21	3.2V

IC14

1	0V
2,3	2.5V
4	−5.0V
5,6	0V(2.6V)
7	0V

IC15

1,2	5.0V
3	0V
4	5.0V
5	5.0V(2.8V)
6	0V(2.8V)
7	0V
8	5.0V(2.8V)
9	0V(2.8V)
10	5.0V(0V)
11	5.0V
12,13	0V
14	5.0V

IC101

1	−4.4V
2,3	0V
4	-9.0V
5,6	4.5V
7	4.7V
8	9.0V

IC102

1,2	0V
3,4	5.0V
5	5.0V(0V)
6,8	0V
7	−0.5V

C103

1~4	0V
5	5.0V(0V)
6	0V
7	4.9V
8~10	5.0V
11~13	0V
14	−4.0V
15	5.0V
16	0V
17	−5.0V
18	2.7V(0V)
19~25	0V
26	5.0V
27~30	0V

IC104

1~3	0V
4	4.6V
5	4.5V(3.6V)
6	−5.0V
7~14	0V
15	-1.0V(−1.7V)
16	−1.2V
17	−5.0V
18~20	0V
21	−4.9V
22	0V
23	-3.5V(−1.8V)
24,25	0V
26	0V
27	4.1V(2.5V)
28	0V(4.8V)
29	4.9V(0V)
30	5.0V

IC105

1~3	0V
4	−0.9
5~7	0V
8	0.9V

IC106

8	0V
9~11	5.0V(2.7V)
12	0V(4.4V)
13	4.1V(2.5V)

IC107

1,2	0V
3	−9.0V
4	0V
5	9.0V

IC108

1~3	0V(0.8V)
4	−0.5V
5~7	0V
8	5.0V

IC109,110

1~3	0V
4	−9.0V
5~7	0V
8	9.0V

IC201

1~3	0V
4	−10.8V
5~7	0V
8	10.1V

	B	C	E
Q1	15.0V	10.7V	15.6V
Q2	−16.1V	−10.8V	−15.5V
Q3(ON)	−10.5V	6.3V	−10.5V
Q3(OFF)	−5.5V	−10.7V	—
Q4	−10.6V (−10.1V)	0V (−10.7V)	−10.8V (−10.8V)
Q5(ON)	0.7V	0V	0V
Q5(OFF)	−10.7V	—	—
Q6	—	0V	—
Q7	0.7V	−3.0V	0V
Q8	—	—	0V
Q13	5.5V	10.5V	4.8V
Q14	3.3V	10.5V	5.0V
Q16,15	5.6V	9.0V	5.0V
Q17	−5.6V	−10.5V	−5.0
Q18	5.7V	9.0V	5.0V
Q20	4.7V	0V	2.3V
Q21	3.1V	0V	2.3V
Q22	0.5V (0V)	0.5V (0V)	5.0V —
Q101	8.5V	5.0V	9.1V
Q102	−8.3V	−5.0V	−9.0V
Q103	5.6V	−14.2V	5.0V
Q104	−30.6V	−39.5V	−30V
Q105	0V	−9.0V	0V
Q106,114	0V	9.0V	0V
Q109,111	0V	−9.0V	—
Q110,112	0V	9.0V	—
Q113,115	0V	−9.0V	0V
Q116	0V	9.0V	0V
Q117	0V	5.0V	0V
Q118	4.5V (3.6V)	1.3V (2.1V)	5.0V (4.3V)
Q119	0.5V	0V	0V

(X25-3820-00)

IC1

5	5.0V(0V)	25~27	5.0V
6	2.5V	28,32	0V
7,10	0V	36	5.0V(0V)
8,9	5.0V	37,39	5.0V
11~13	0V(5.0V)	38	0V
14	5.0(ON) 0V(OFF)	50,51 52,53	4.9V(0V) 0V
15,19	5.0V	56	−30V
16~18	0V	57	−5.0V
20~24	0V	64	5.0V

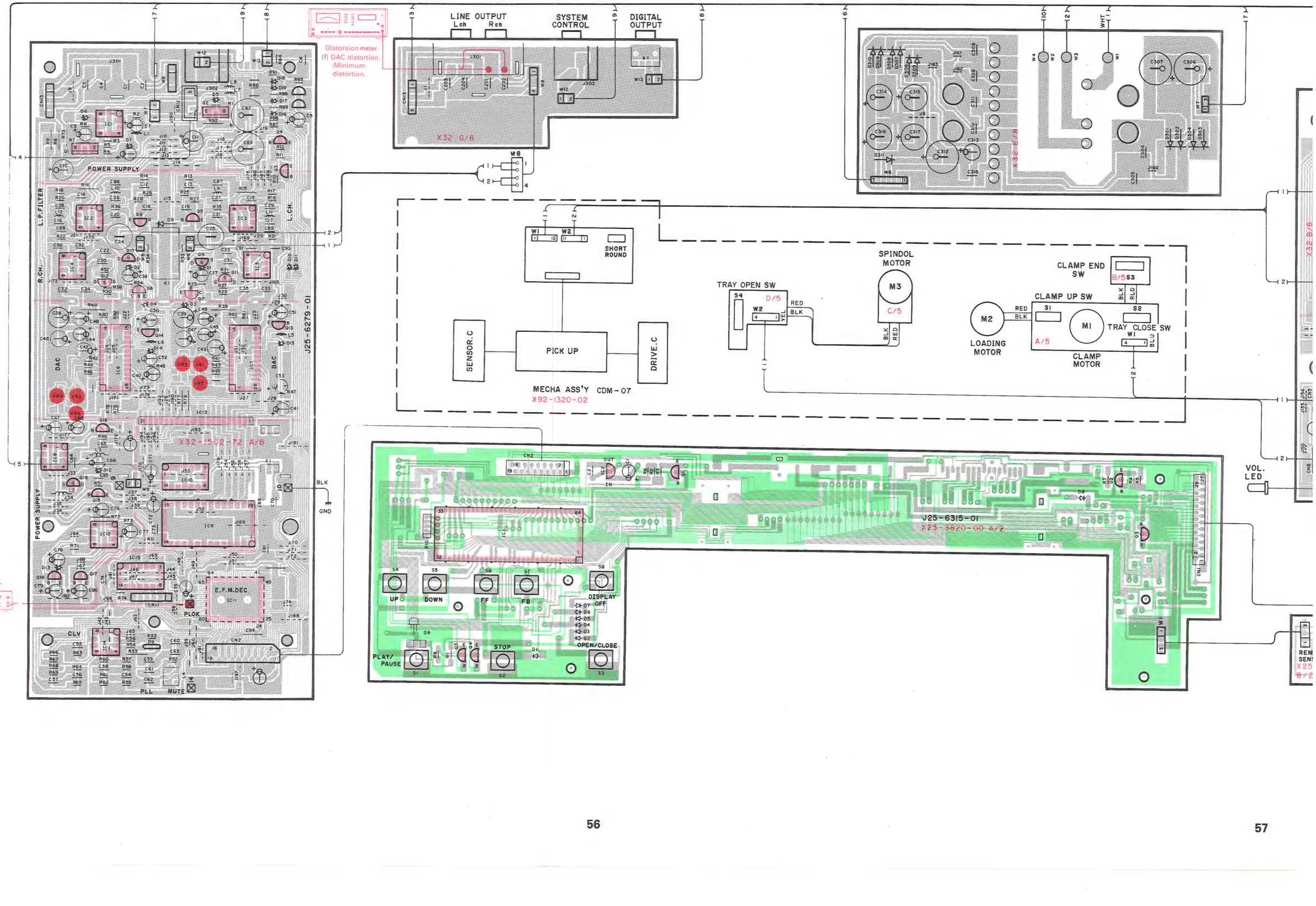
IC2

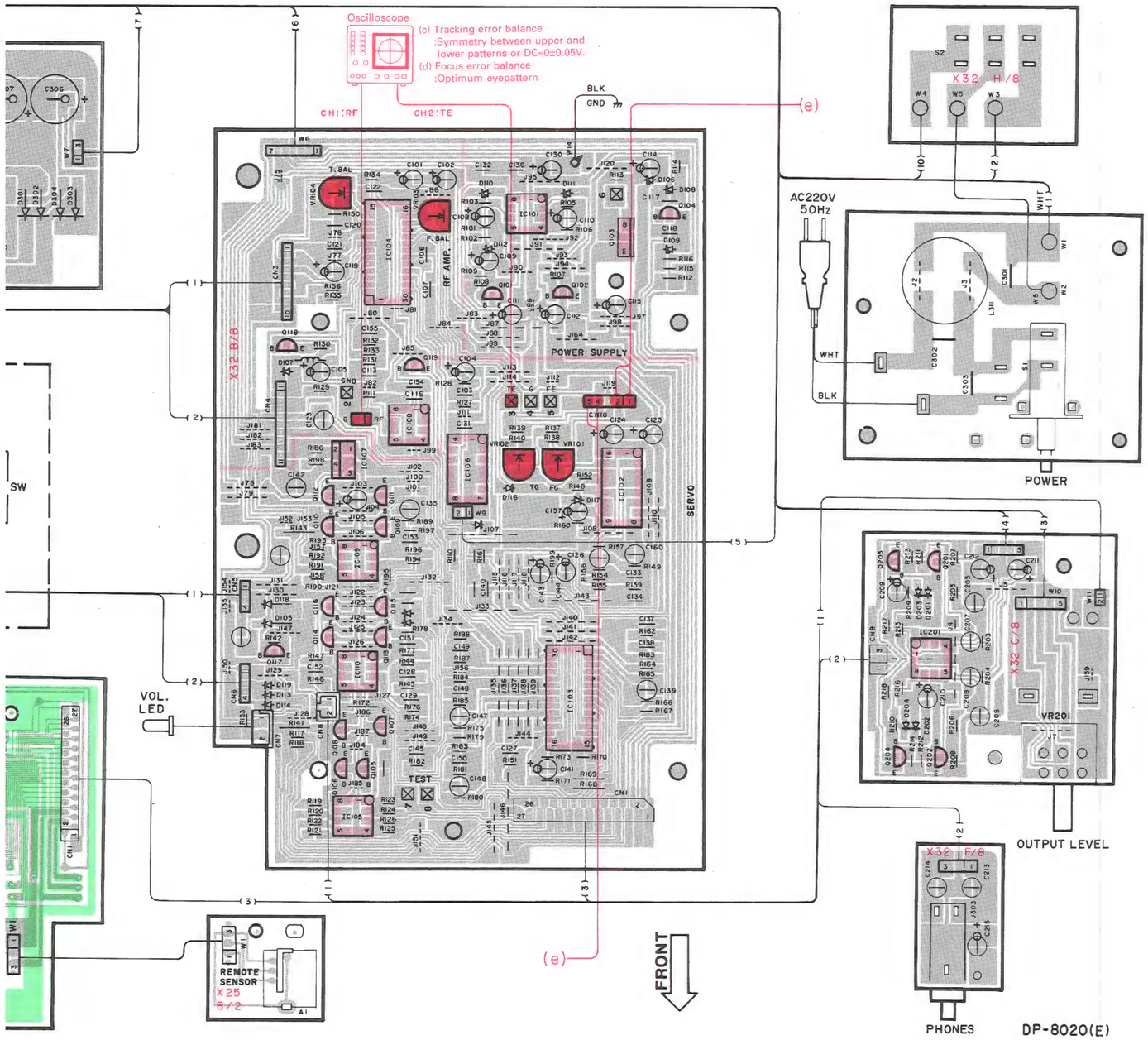
1,3	5.0V
2	0V

	B	C	E
Q1,2	−26.6V	5.0V	−26.6V
Q3	5.0V(0V)	0V(5.0V)	5.0V
Q4	5.0V	−9.0V(0V)	5.0V

Refer to the schematic diagram for the values of resistors and capacitors.

PC BOARD (FOIL SIDE VIEW)





(X32-1500-22)

IC1

1	−2.6V
2,3	0V
4	−16.2V
5,6	5.6V
7	2.0V
8	15.6V

IC2,3

1~3	0V
4	−10.4V
5~7	0V
8	10.5V

IC4

2,3	0V
4	−10.4V
5~7	0V
8	10.5V

IC5

1~3	0V
4	−10.4V
5~7	0V
8	10.5V

IC6,7

1.2	0V
3	−9.5V
4	−9.6V
5,6	−9.7V
7(IC6)	−9.0V
7(IC7)	9.0V
8	1.7V
9	5.0V
10	−4.3V
11	3.3V
12~18	0V
19	5.0V
20~22	1.0V
23	3.3V
24	3.0V
25	4.0V
26	0V
27(IC6)	−11.0V
27(IC7)	11.0V
28	0V

C8

1	5.6V
2,3	5.0V
4	−10.5V
5,6	5.0V
7	5.6V
8	9.0V

IC9

1	0V(2.8V)
2	3.4V
3	5.0V
4,5	0V
6	3.2V
7	2.7V
8	0V
9	3.1V
10~13	0V
14,15	5.0V
16	0V
17	5.0V
18,19	0V
20	2.9V
21	0V
22	5.0V
23,24	0V
25	4.0V
26	2.8V
27,28	2.5V

IC10

1~6	3.3V
7	0V
8	3.3V
9	2.8V
10~13	3.3V
14	5.0V

C11

1	0V	34~40	0V
2	0V(5.0V)	51	3.3V
3	0V(2.5V)	52	0V
4	0V(2.8V)	53	3.1V
5	0V(3.0V)	54	2.3V
6	0V(2.9V)	55,56	0V
7	0V(5.0V)	57	5.0V
8	2.4V	58,59	0V
9	3.3V	65,66	1.9V(0V)
10	0V	67	5.0V(0V)
11	2.5V	68	1.0V(2.5V)
12	0V	69	2.5V
13~16	5.0V	70	3.3V
17	0V	71	5.0V
18,19	0V(0.5V)	72	5.0V(0V)
20~24	0V	73	5.0V
25	2.5V	74	5.0V(0V)
26	0V	75	2.6V
27	3.1V	76,77	3.2V
28~32	0V	78	0V
33	5.0V	79,80	2.5V

IC12

1	−5.6V
2,3	0V
4	−10.5V
5,6	5.0V
7	5.7V
8	9.0V

IC13

1	5.0V
2	2.8V
3	3.1
4	4.0V
5~8	0V
9	5.0V
10,11	0V
12	5.0V
13	3.8V
14	5.0V(3.8V)
15	3.8V
16	5.0V(3.8V)
17	0V
18	5.0V
19	4.0V
20	3.3V
21	3.2V

IC14

1	0V
2,3	2.5V
4	−5.0V
5,6	0V(2.6V)
7	0V

IC15

1,2	5.0V
3	0V
4	5.0V
5	5.0V(2.8V)
6	0V(2.8V)
7	0V
8	5.0V(2.8V)
9	0V(2.8V)
10	5.0V(0V)
11	5.0V
12,13	0V
14	5.0V

IC101

1	−4.4V
2,3	0V
4	−9.0V
5,6	4.5V
7	4.7V
8	9.0V

IC102

1,2	0V
3,4	5.0V
5	5.0V(0V)
6,8	0V
7	−0.5V

C103

1~4	0V
5	5.0V(0V)
6	0V
7	4.9V
8~10	5.0V
11~13	0V
14	−4.0V
15	5.0V
16	0V
17	−5.0V
18	2.7V(0V)
19~25	0V
26	5.0V
27~30	0V

IC104

1~3	0V
4	4.6V
5	4.5V(3.6V)
6	−5.0V
7~14	0V
15	−1.0V(−1.7V)
16	−1.2V
17	−5.0V
18~20	0V
21	−4.9V
22	0V
23	−3.5V(−1.8V)
24,25	0V
26	0V
27	4.1V(2.5V)
28	0V(4.8V)
29	4.9V(0V)
30	5.0V

IC105

1~3	0V
4	−0.9
5~7	0V
8	0.9V

IC106

8	0V
9~11	5.0V(2.7V)
12	0V(4.4V)
13	4.1V(2.5V)

IC107

1,2	0V
3	−9.0V
4	0V
5	9.0V

IC108

1~3	0V(0.8V)
4	−0.5V
5~7	0V
8	5.0V

IC109,110

1~3	0V
4	−9.0V
5~7	0V
8	9.0V

IC201

1~3	0V
4	−10.8V
5~7	0V
8	10.1V

	B	C	E
Q1	15.0V	10.7V	15.6V
Q2	−16.1V	−10.8V	−15.5V
Q3(ON)	−10.5V	6.3V	−10.5V
Q3(OFF)	−5.5V	−10.7V	—
Q4	−10.6V (−10.1V)	0V (−10.7V)	−10.8V (−10.8V)
Q5(ON)	0.7V	0V	0V
Q5(OFF)	−10.7V	—	—
Q6	—	0V	—
Q7	0.7V	−3.0V	0V
Q8	—	—	0V
Q13	5.5V	10.5V	4.8V
Q14	3.3V	10.5V	5.0V
Q16,15	5.6V	9.0V	5.0V
Q17	−5.6V	−10.5V	−5,0
Q18	5.7V	9.0V	5.0V
Q20	4.7V	0V	2.3V
Q21	3.1V	0V	2.3V
Q22	0.5V (0V)	0.5V (0V)	5.0V —
Q101	8.5V	5.0V	9.1V
Q102	−8.3V	−5.0V	−9.0V
Q103	5.6V	−14.2V	5.0V
Q104	−30.6V	−39.5V	−30V
Q105	0V	−9.0V	0V
Q106,114	0V	9.0V	0V
Q109,111	0V	−9.0V	—
Q110,112	0V	9.0V	—
Q113,115	0V	−9.0V	0V
Q116	0V	9.0V	0V
Q117	0V	5.0V	0V
Q118	4.5V (3.6V)	1.3V (2.1V)	5.0V (4.3V)
Q119	0.5V	0V	0V

(X25-3820-00)

IC1

5	5.0V(0V)	25~27	5.0V
6	2.5V	28,32	0V
7,10	0V	36	5.0V(0V)
8,9	5.0V	37.39	5.0V
11~13	0V(5.0V)	38	0V
14	5.0(ON)	50.51	4.9V(0V)
	0V(OFF)	52,53	0V
15,19	5.0V	56	−30V
16~18	0V	57	−5.0V
20~24	0V	64	5.0V

IC2

1,3	5.0V
2	0V

	B	C	E
Q1,2	−26.6V	5.0V	−26.6V
Q3	5.0V(0V)	0V(5.0V)	5.0V
Q4	5.0V	−9.0V(0V)	5.0V

Refer to the schematic diagram for the values of resistors and capacitors.

(X32-1500-22)(A/8)

X32-1500-22	(M)
2-72	(X,T,E)

CN2 (Vss, MUTE, EMPH, SDATA, BUSY, CX4M, GFS, WFCK, SCOR, SUBQ, MUTG, SENS, C IN, XRST, DATA, XLT, CLK, CLV, MON)

WQ (GND, EFM)

PLCK

IC11 DIGITAL SIGNAL PROCESSOR / RAM

(PLAY) STOP when power ON.

IC14 (1/2) CLV — PLL

IC14 (2/2) CLV

IC8 (1/2) +5V BUFFER — IC8 (2/2) +5V AVR

Q19, Q16, Q15, Q22

IC10 MASTER CLOCK — 16.9344 MHz

19SB, 20SB DETECTOR

IC13

IC9 DIGITAL FILTER

IC12 (1/2) Q18 +5V AVR — IC12 (2/2) Q17 −5V AVR

DATA SELECTOR IC15

IC7 D/A CONVERTER — VR5 100K, VR3 100K, VR1 100K

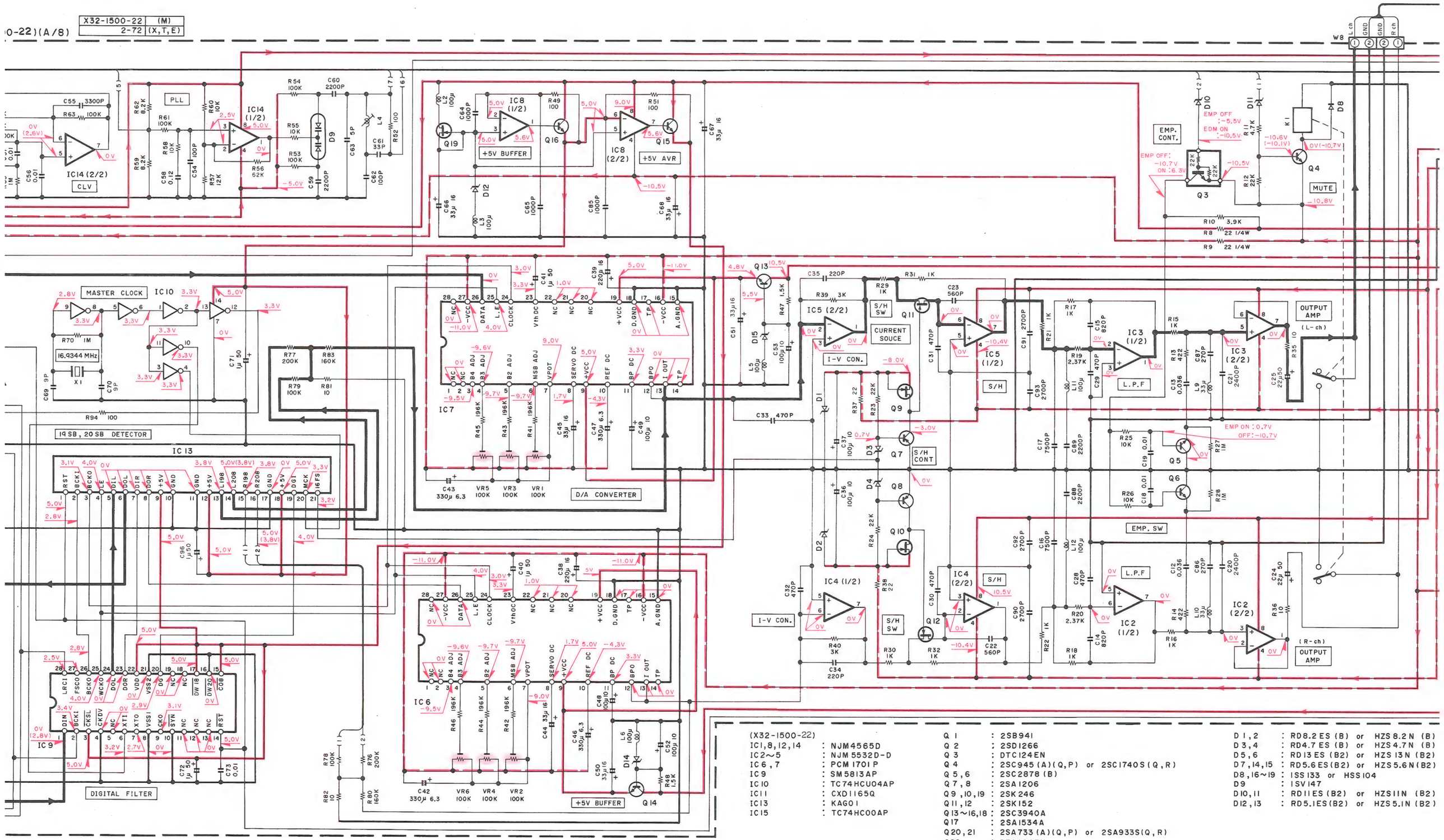
IC6 +5V BUFFER — VR6 100K, VR4 100K, VR2 100K

Q13, IC5 (2/2), I-V CON., IC4 (1/2), I-V CON.

CN11 (GND, BCK, D OUT, LRCK, DIN, SEL)

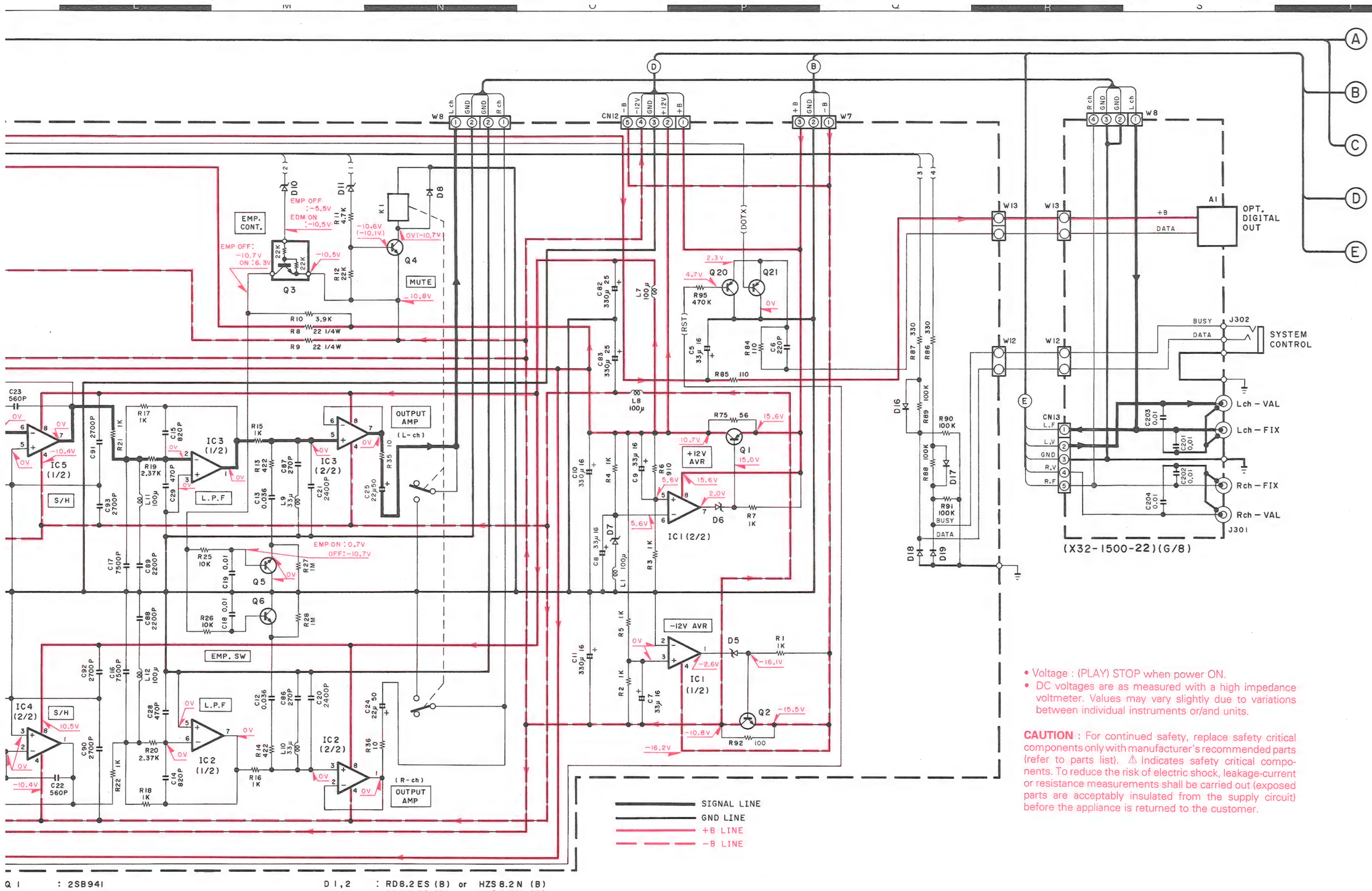
(X32-1500-22)

IC1,8,12,14	: NJM4565D
IC2~5	: NJM5532D
IC6,7	: PCM1701P
IC9	: SM5813AP
IC10	: TC74HCU04
IC11	: CXD1165Q
IC13	: KAG01
IC15	: TC74HC00A



(X32-1500-22)

IC1,8,12,14	: NJM4565D	Q 1	: 2SB941	D 1,2	: RD8.2ES (B) or HZS8.2N (B)
IC2~5	: NJM5532D-D	Q 2	: 2SD1266	D 3,4	: RD4.7ES (B) or HZS4.7N (B)
IC6,7	: PCM1701P	Q 3	: DTC124EN	D 5,6	: RD13ES (B2) or HZS13N (B2)
IC9	: SM5813AP	Q 4	: 2SC945(A)(Q,P) or 2SC1740S(Q,R)	D 7,14,15	: RD5.6ES(B2) or HZS5.6N(B2)
IC10	: TC74HCU04AP	Q 5,6	: 2SC2878(B)	D 8,16~19	: 1SS133 or HSS104
IC11	: CXD1165Q	Q 7,8	: 2SA1206	D 9	: 1SV147
IC13	: KAG01	Q 9,10,19	: 2SK246	D10,11	: RD11ES(B2) or HZS11N (B2)
IC15	: TC74HC00AP	Q 11,12	: 2SK152	D12,13	: RD5.1ES(B2) or HZS5.1N (B2)
		Q 13~16,18	: 2SC3940A		
		Q 17	: 2SA1534A		
		Q 20,21	: 2SA733(A)(Q,P) or 2SA933S(Q,R)		
		Q 22	: DTA124EN		



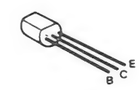
- Voltage : (PLAY) STOP when power ON.
- DC voltages are as measured with a high impedance voltmeter. Values may vary slightly due to variations between individual instruments or/and units.

CAUTION : For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list). ⚠ Indicates safety critical components. To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the customer.

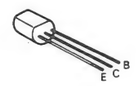
Q 1 : 2SB941
Q 2 : 2SD1266
Q 3 : DTC124EN
Q 4 : 2SC945(A)(Q,P) or 2SC1740S(Q,R)
Q 5,6 : 2SC2878(B)
Q 7,8 : 2SA1206
Q 9,10,19 : 2SK246
Q 11,12 : 2SK152
Q 13~16,18 : 2SC3940A
Q 17 : 2SA1534A
Q 20,21 : 2SA733(A)(Q,P) or 2SA933S(Q,R)
Q 22 : DTA124EN

D 1,2 : RD8.2ES(B) or HZS8.2N(B)
D 3,4 : RD4.7ES(B) or HZS4.7N(B)
D 5,6 : RD13ES(B2) or HZS13N(B2)
D 7,14,15 : RD5.6ES(B2) or HZS5.6N(B2)
D 8,16~19 : 1SS133 or HSS104
D 9 : 1SV147
D 10,11 : RD11ES(B2) or HZS11N(B2)
D 12,13 : RD5.1ES(B2) or HZS5.1N(B2)

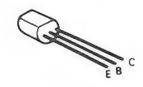
DTA124EN



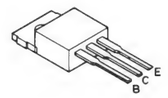
DTC124EN
2SA1534A
2SA733(A)
2SC2878
2SC3940A
2SC945(A)



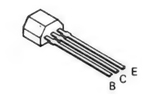
2SA1206



2SD1266

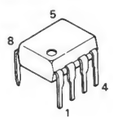


2SA933S
2SC1740S

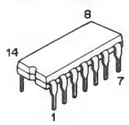


2SB941

NJM5532D-D



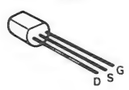
TC74HCU04AP
TC74HC00AP



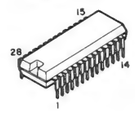
NJM4565D

2SK246

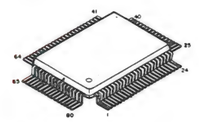
2SK152



SM5813AP

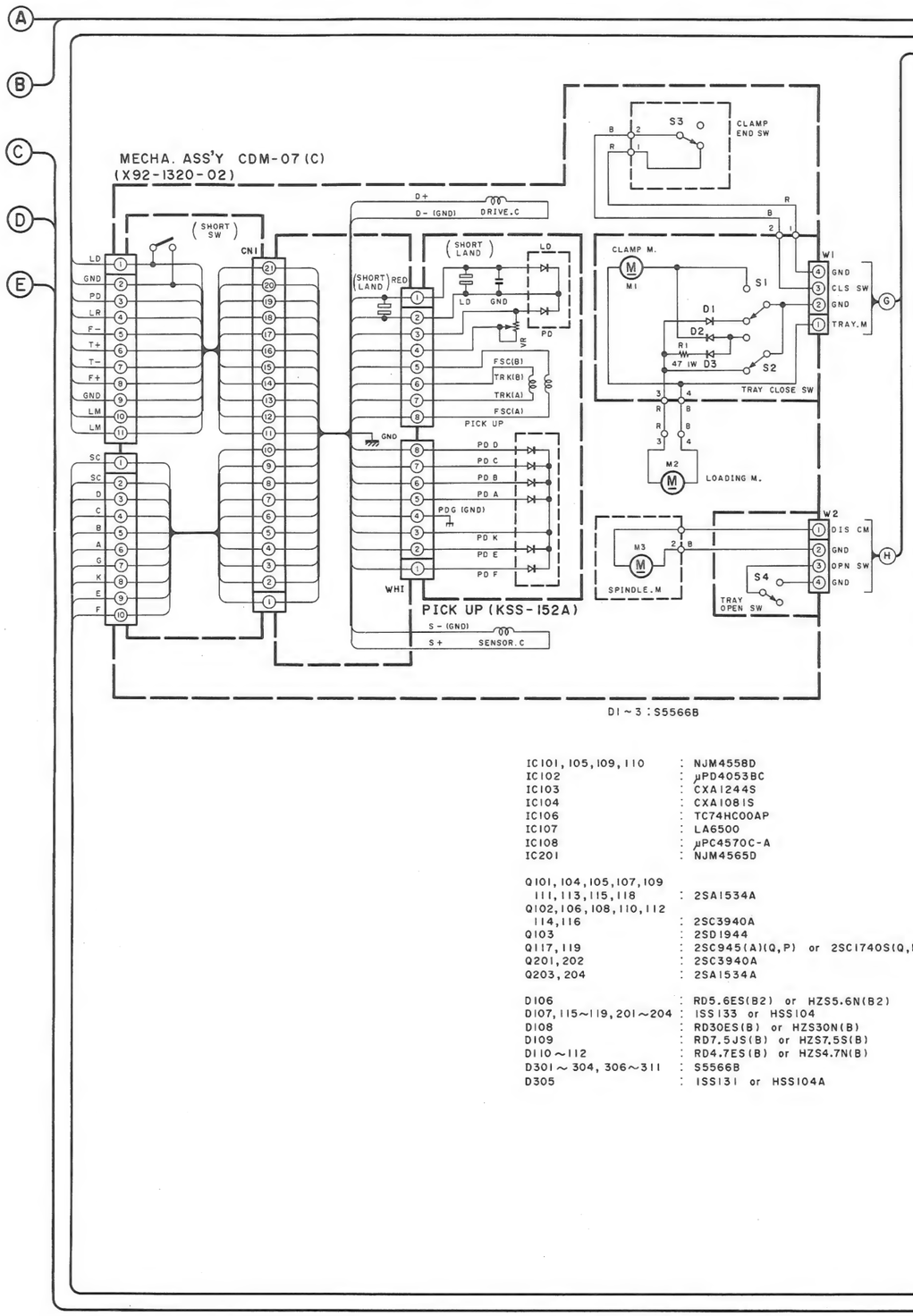


CXD1165Q

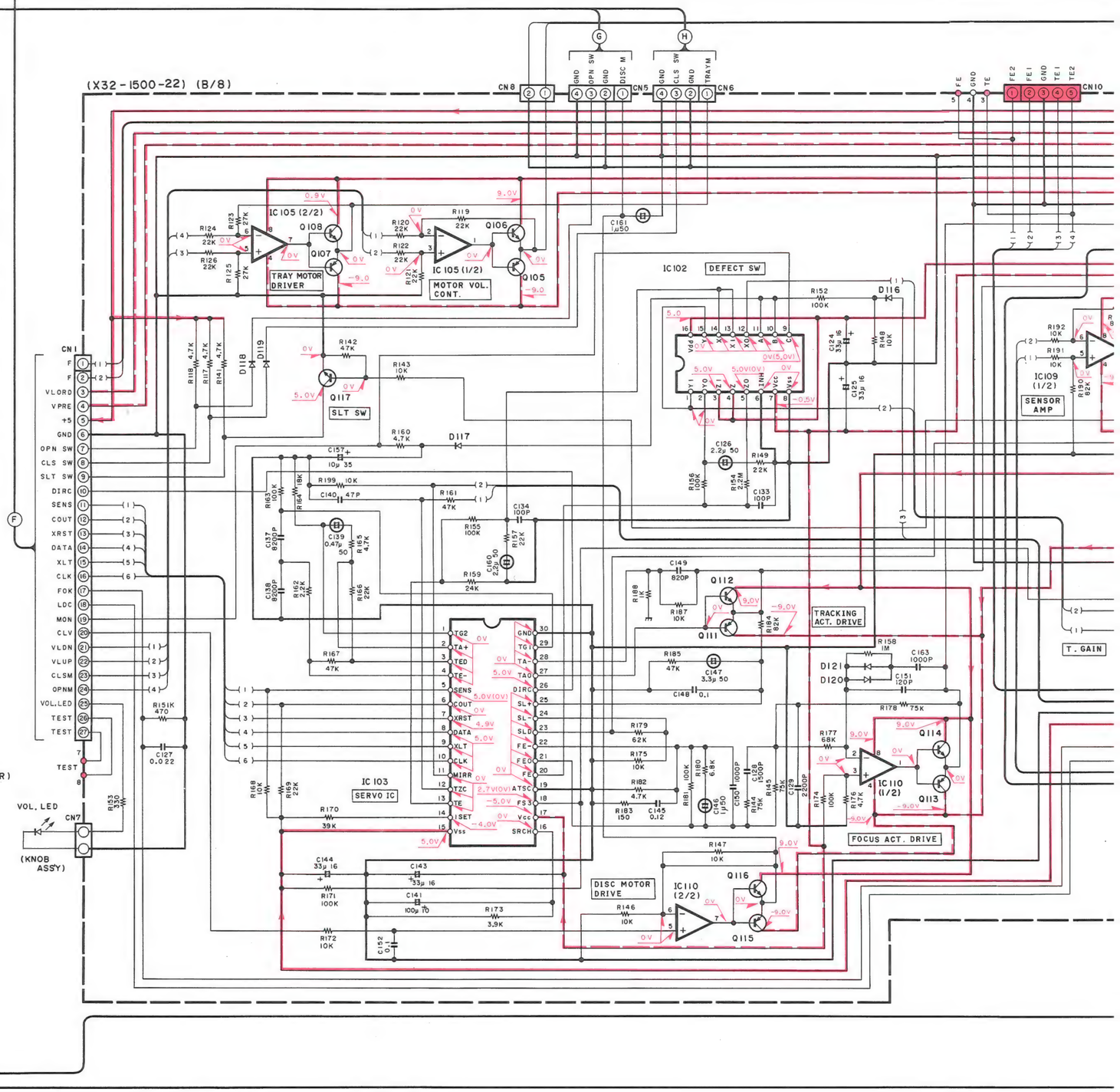


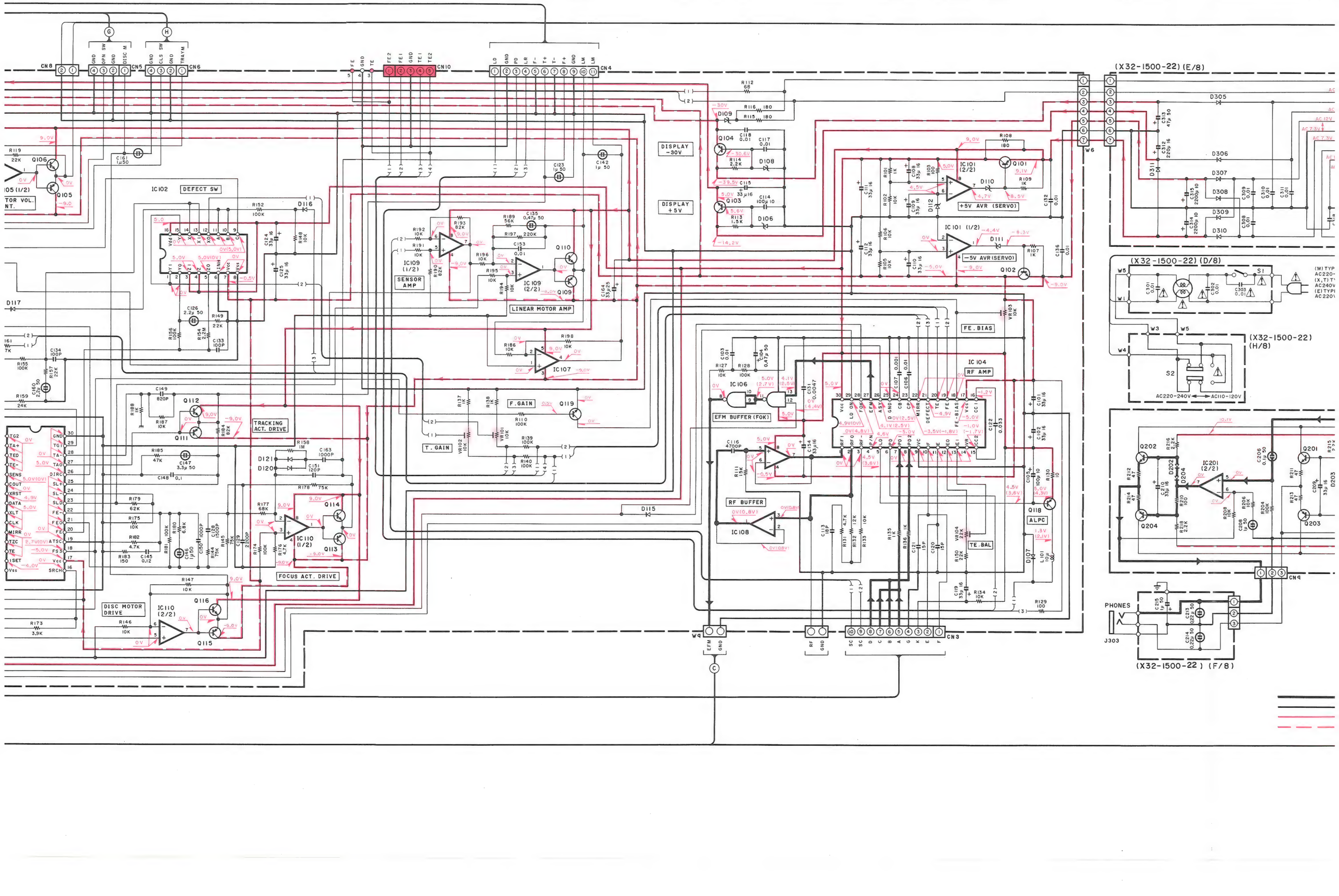
Y22-1900-21

DP-8020
KENWOOD

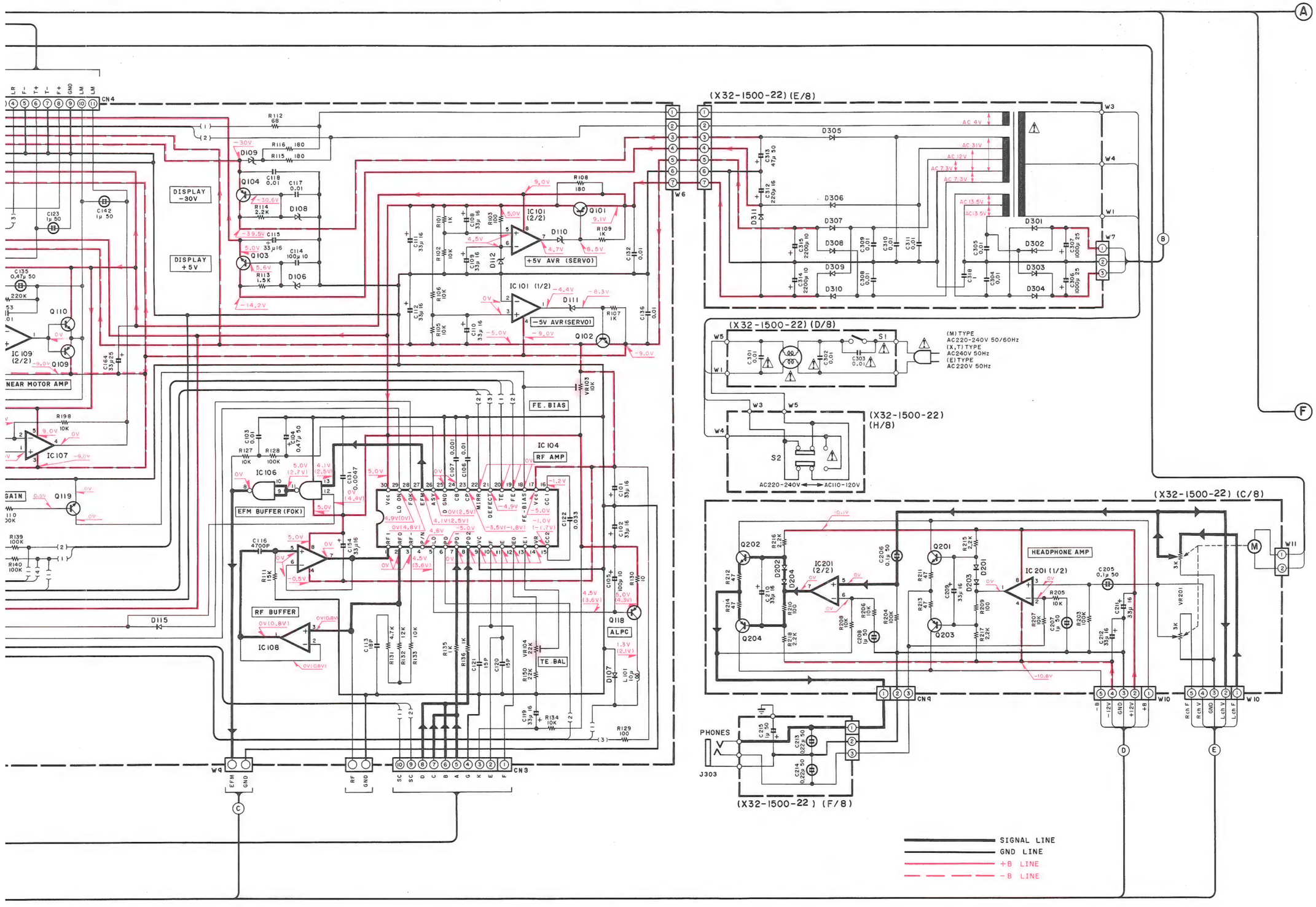


IC101, 105, 109, 110	:	NJM4558D
IC102	:	μPD4053BC
IC103	:	CXA1244S
IC104	:	CXA1081S
IC106	:	TC74HC00AP
IC107	:	LA6500
IC108	:	μPC4570C-A
IC201	:	NJM4565D
Q101, 104, 105, 107, 109 111, 113, 115, 118	:	2SA1534A
Q102, 106, 108, 110, 112 114, 116	:	2SC3940A
Q103	:	2SD1944
Q117, 119	:	2SC945(A)(Q,P) or 2SC1740S(Q,R)
Q201, 202	:	2SC3940A
Q203, 204	:	2SA1534A
D106	:	RD5.6ES(B2) or HZS5.6N(B2)
D107, 115~119, 201~204	:	1SS133 or HSS104
D108	:	RD30ES(B) or HZS30N(B)
D109	:	RD7.5JS(B) or HZS7.5S(B)
D110~112	:	RD4.7ES(B) or HZS4.7N(B)
D301~304, 306~311	:	S5566B
D305	:	1SS131 or HSS104A

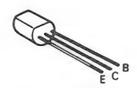



CN8
CN5
CN6
CN10
CN4
DISPLAY −30V
DISPLAY +5V
IC102 DEFECT SW
IC109 (1/2) SENSOR AMP
IC109 (2/2)
LINEAR MOTOR AMP
IC107
TRACKING ACT. DRIVE
F.GAIN
T. GAIN
FOCUS ACT. DRIVE
IC110 (1/2)
IC110 (2/2)
DISC MOTOR DRIVE
IC101 (2/2) +5V AVR (SERVO)
IC101 (1/2) −5V AVR(SERVO)
FE. BIAS
IC104 RF AMP
IC106 EFM BUFFER (FOK)
IC108 RF BUFFER
TE. BAL
ALPC
(X32-1500-22) (E/8)
(X32-1500-22) (D/8)
(X32-1500-22) (H/8)
(X32-1500-22) (F/8)
W6
W9
CN3
CN9
J303
PHONES
AC220-240V
AC110-120V

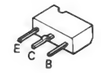
AG AH AI AJ AK AL AM AN AO AP



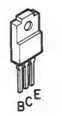
2SA1534A
2SC3940A
2SC945(A)



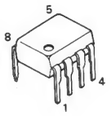
2SC3666
2SA1426



2SD1944

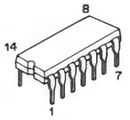


NJM4558D

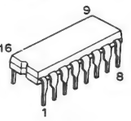


NJM4565D

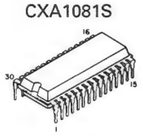
TC74HC00AP



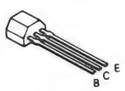
μPD4570C-A
μPD4053BC



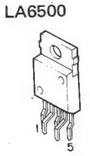
CXA1244S
CXA1081S



2SC1740S



LA6500



CAUTION : For continued safety, replace safety c components only with manufacturer's recommendec (refer to parts list). ⚠ Indicates safety critical co nents. To reduce the risk of electric shock, leakage-c or resistance measurements shall be carried out (ex parts are acceptably insulated from the supply c before the appliance is returned to the customer.

- DC voltages are as measured with a high impe voltmeter. Values may vary slightly due to vari between individual instruments or/and units.
- Voltage : (PLAY) STOP when power ON.

Y22-1900-21

DP-8020
KENWOOD

(X25-3820-00)(A/2)

FL1

DISC · OUT · A · B · REPEAT · TRACK · PROGRAM · TIME · CCRS

TRACK NO. · INDEX PNO. · P.C. · SINGLE TOTAL TIME · EMPHASIS · RANDOM · SPACE · EDIT

9G 8G 7G 6G 5G 4G 3G 2G 1G

IC1 : μPD75216AC
IC2 : M51951ASL

Q1, 2 : 2SC945(A)(
Q3~5 : DTA124EN

D1~8 : HSS104A or
D9 : B30-1263-

GN
+
−

CN1: TEST, TEST, VLLED, OPNM, CLSM, VLUP, VLDN, CLV, MON, LDC, FOK, CLK, XLT, DATA, XRST, COUT, SENS, DIRC, SLTSW, CLSSW, OPNSW, GND, +5V, VPRE, VLORD, F, F (AC 4V)

CN2: GND, MUTE, EMPH, SDATA, BUSY, CK4M, GFS, WFCK, SCOR, SUBQ, MUTG, SENS, CIN, XRST, DATA, XLT, CLK, CLV, MON

D8

Q2 BUFFER · Q1 BUFFER · −26.6V · 5.0V · R4 100K · R3 100K · R5 100K · R7 1K · R2 100K · R6 1K · Q5 · 22K · 22K · VOL. LED BUFFER · 0V

C3 0.01 · C4 0.01 · C2 0.01 · C1 33μ16 · C5 0.01

RESET · IC2 GND OUT IN

CP1 2.2K×4

IC1 μ-COM

VDD Sa Sb Sc Sd SENSE WFCK SUBQ SLTSW RCI SCOR FOK GFS MUTE EMPH DIRC VLDWN BUSY SDATA OPNSW CLSSW KD0 KD1 KD2 KD3 DATA XLT CLK VLUP CK4M VSS

VDD VPRE VLORD SX SI CLSM OPNM MUTG LDC G9 G8 G7 G6 G5 G4 G3 G2 G1 RST FL BLANK PUSLED PLYLED VLLED

−5.0V · −30V · 5.0V · 0V · 4.9V(0V) · 2.5V · 5.0V(0V) · EMP ON : 5.0V · EMPH OFF : 0V

(PLAY) STOP when power on.

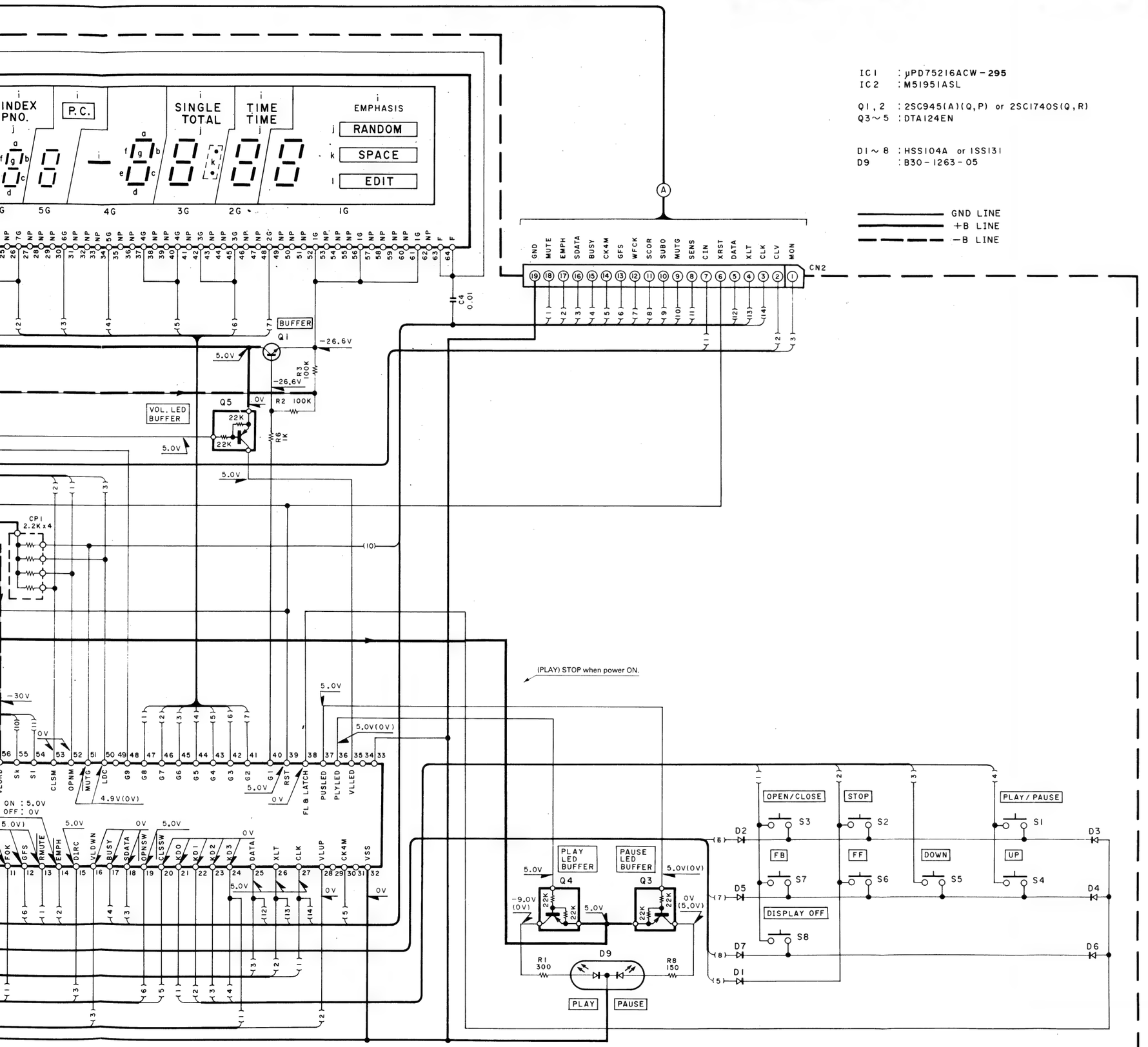
PLAY LED BUFFER · PAUSE LED BUFFER · Q4 · Q3 · 22K · −9.0V (0V) · 5.0V(0V) · 0V (5.0V)

D2 · D5 · D7 · D1 · D9 · R1 300 · R8 150 · PLAY · PAUSE

OPEN/CLOSE S3 · STOP S2 · FB S7 · FF S6 · DOWN S5 · DISPLAY OFF S8

W1 (3 2 1) · A1 · REMOCON RECEIVER

(X25-3820-00)(B/2)



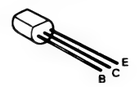
IC1 : µPD75216ACW-295
IC2 : M51951ASL

Q1, 2 : 2SC945(A)(Q,P) or 2SC1740S(Q,R)
Q3～5 : DTA124EN

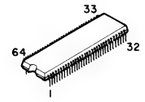
D1～8 : HSS104A or ISS131
D9 : B30-1263-05

GND LINE
+B LINE
−B LINE

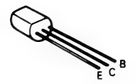
DTA124EN



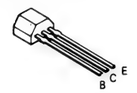
µPD75216ACW-295



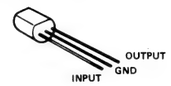
2SC945



2SC1740S



M51951ASL



CAUTION : For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list). ⚠ Indicates safety critical components. To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the customer.

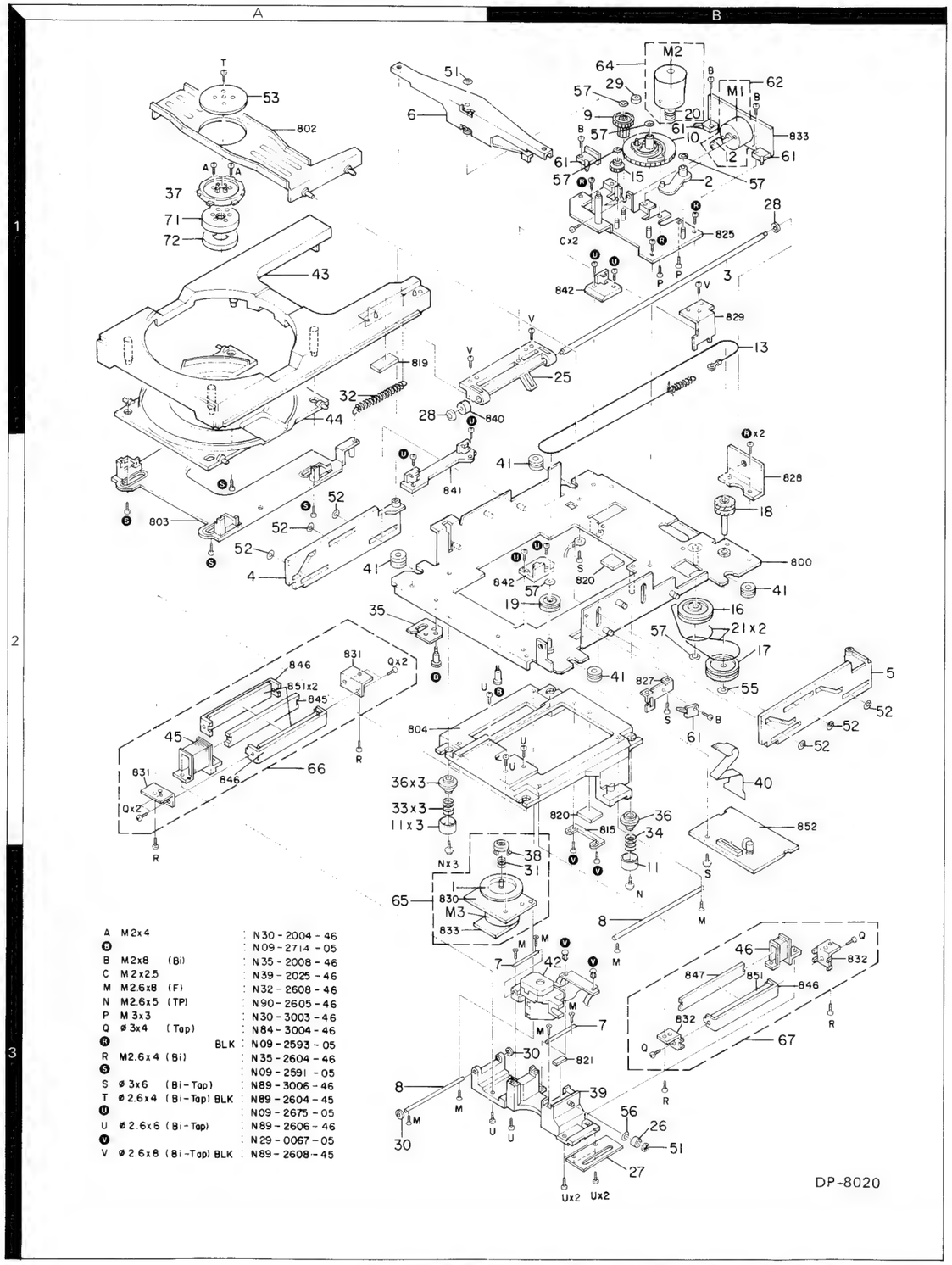
- DC voltages are as measured with a high impedance voltmeter. Values may vary slightly due to variations between individual instruments or/and units.

Y22-1900-21

DP-8020

KENWOOD

EXPLODED VIEW (MECHANISM)

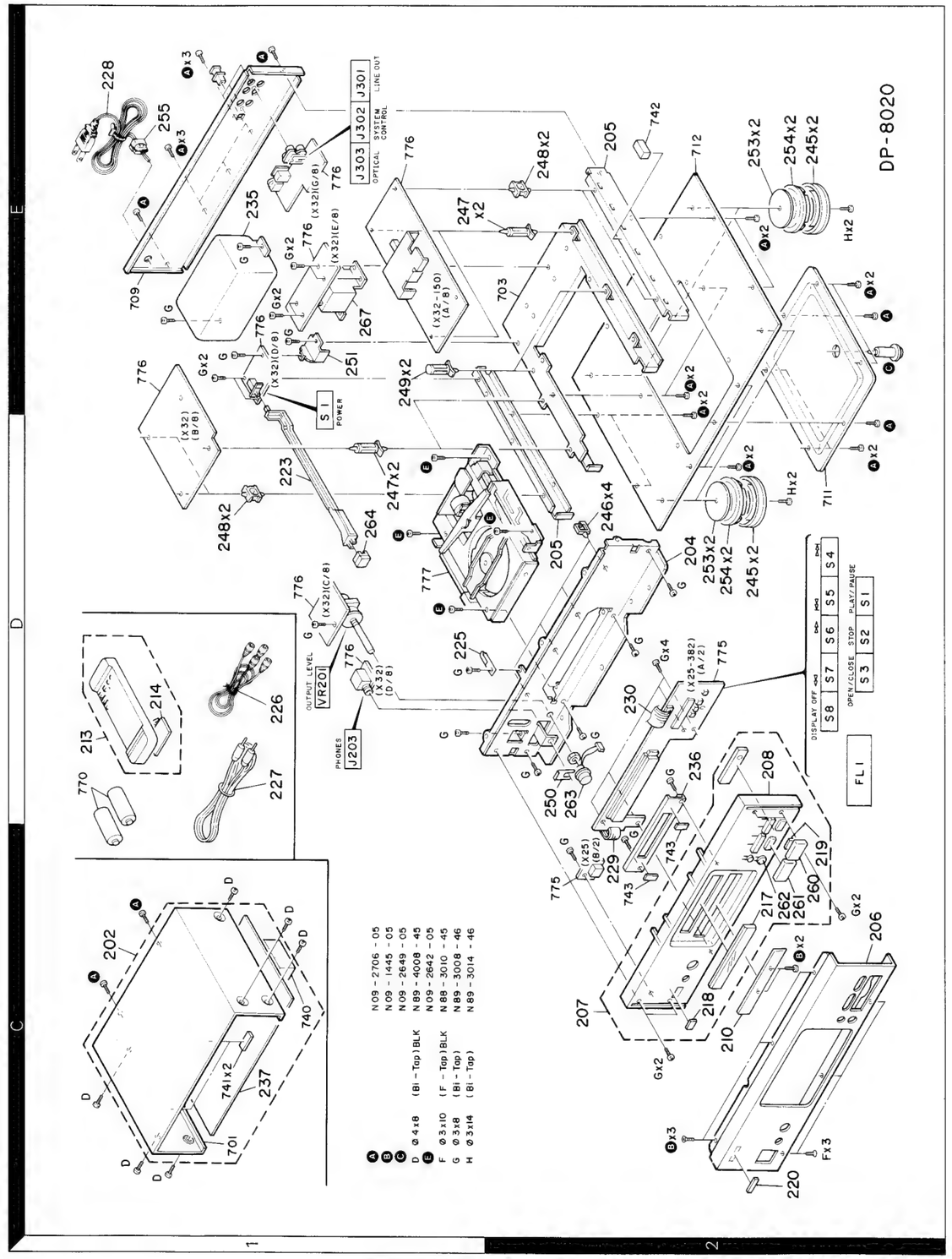


A	M2x4		N30 - 2004 - 46
B			N09 - 2714 - 05
B	M2x8	(Bi)	N35 - 2008 - 46
C	M2.2x2.5		N39 - 2025 - 46
M	M2.6x8	(F)	N32 - 2608 - 46
N	M2.6x5	(TP)	N90 - 2605 - 46
P	M 3x3		N30 - 3003 - 46
Q	ø3x4	(Tap)	N84 - 3004 - 46
R		BLK	N09 - 2593 - 05
R	M2.6x4	(Bi)	N35 - 2604 - 46
S			N09 - 2591 - 05
S	ø3x6	(Bi-Tap)	N89 - 3006 - 46
T	ø2.6x4	(Bi-Tap) BLK	N89 - 2604 - 45
U			N09 - 2675 - 05
U	ø2.6x6	(Bi-Tap)	N89 - 2606 - 46
V			N29 - 0067 - 05
V	ø2.6x8	(Bi-Tap) BLK	N89 - 2608 - 45

Parts with the exploded numbers larger than 700 are not supplied.

DP-8020

EXPLODED VIEW (UNIT)



A	Ø3x10	(F - Tap) BLK	N88 - 3010 - 45
B	Ø3x8	(Bi - Tap)	N89 - 3008 - 46
C	Ø3x14	(Bi - Tap)	N89 - 3014 - 46
D	Ø4x8	(Bi - Tap) BLK	N09 - 2706 - 05
E			N09 - 1445 - 05
			N09 - 2649 - 05
			N89 - 4008 - 45
			N09 - 2642 - 05

Parts with the exploded numbers larger than 700 are not supplied.

PARTS LIST

* New Parts
Parts without **Parts No.** are not supplied.
Les articles non mentionnes dans le **Parts No.** ne sont pas fournis.
Teile ohne **Parts No.** werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
			DP-8020			
202	1C	*	A01-1853-02	METALLIC CABINET ASSY		
204	2D	*	A13-1223-02	FRAME		
205	2D,2E	*	A13-1224-12	FRAME		
206	2C	*	A20-5900-02	PANEL		
207	2D	*	A22-1132-12	SUB PANEL ASSY		
208	2D	*	A22-1133-01	SUB PANEL		
210	2C	*	A29-0151-04	PANEL ASSY(TRAY)		
213	1D	*	A70-0308-05	REMOCON ASSY(RC-P8020)		
214	1D		A09-0078-08	BATTERY COVER		
217	2C	*	B10-1046-04	FRONT GLASS		
218	2C	*	B10-1047-04	FRONT GLASS		
219	2D		B12-0066-04	INDICATOR		
220	2C		B43-0287-04	KENWOOD BADGE		
-			B46-0096-13	WARRANTY CARD	X	
-			B46-0122-13	WARRANTY CARD	E	
-			B46-0143-03	WARRANTY CARD	T	
-		*	B50-9866-00	INSTRUCTION MANUAL(ENGLISH)		
-		*	B50-9867-00	INSTRUCTION MANUAL(FRENCH)	ME	
-		*	B50-9868-00	INSTRUCTION MANUAL(SPANISH)	M	
-		*	B50-9869-00	INSTRUCTION MANUAL(G,D,I)	E	
-			B58-0400-04	CAUTION CARD		
-			B58-0895-04	CAUTION CARD		
223	1D		D21-1504-03	EXTENSION SHAFT		
226	1D		E30-0505-05	AUDIO CORD		
227	1D		E30-0977-05	CORD WITH PLUG		
⚠ 228	1E		E30-0459-05	AC POWER CORD	ME	
⚠ 228	1E		E30-1341-05	AC POWER CORD	X	
⚠ 228	1E		E30-1416-05	AC POWER CORD	T	
229	2D		E31-4289-05	WIRING HARNESS		
230	2D		E31-4790-05	WIRING HARNESS		
235	1E	*	F11-0440-03	SHIELDING CASE		
236	2D	*	F31-0198-03	REINFORCING HARDWARE		
237	1C		F39-0041-03	REINFORCING PLATE		
-		*	H01-8637-04	ITEM CARTON CASE		
-		*	H10-3898-02	POLYSTYRENE FOAMED FIXTURE		
-		*	H10-3899-02	POLYSTYRENE FOAMED FIXTURE		
-			H20-0554-04	PROTECTION COVER	M	
-		*	H21-0274-04	PROTECTION SHEET		
-			H25-0232-04	PROTECTION BAG (235X350X0.03)		
-			H25-0319-04	PROTECTION BAG	XTE	
245	2D,2E		J02-1002-05	FOOT		
246	2D	*	J11-0163-05	WIRE CLAMPER		
247	1D,2E		J19-0517-05	UNIT HOLDER		
248	1D,2E		J19-2855-15	UNIT HOLDER		
249	1E	*	J19-3056-05	UNIT HOLDER		
250	2D		J21-3326-05	JACK MOUNTING HARDWARE		
251	1E	*	J21-5518-04	MOUNTING HARDWARE		
253	2D,2E	*	J30-0270-04	SPACER		
254	2D,2E		J39-0154-04	SPACER		
⚠ 255	1E		J42-0083-05	POWER CORD BUSHING		

E: Scandinavia & Europe K: USA P: Canada
U: PX(Far East, Hawaii) T: England M: Other Areas
UE: AAFES(Europe) X: Australia

⚠ indicates safety critical components.

PARTS LIST

* New Parts
Parts without Parts No. are not supplied.
Les articles non mentionnes dans le Parts No. ne sont pas fournis.
Teile ohne Parts No. werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
-			J61-0307-05	WIRE BAND		
260	2C	*	K29-3784-04	KNOB(PLAY/PAUSE)		
261	2C	*	K29-3785-04	KNOB(STOP)		
262	2C	*	K29-3786-04	KNOB(OPEN/CLOSE)		
263	2D	*	K29-3796-05	KNOB ASSY		
264	1D	*	K29-3835-04	KNOB		
⚠ 267	1E		L01-5602-05	POWER TRANSFORMER	XTE	
⚠ 267	1E		L01-5604-05	POWER TRANSFORMER	M	
A			N09-0301-05	TAPTITE SCREW		
B			N09-1445-05	SET SCREW (M3X8)		
C			N09-2649-05	STEPPED SCREW		
D			N89-4008-45	BINDING HEAD TAPTITE SCREW		
E		*	N89-1785-05	STEPPED SCREW		
F			N88-3010-45	FLAT HEAD TAPTITE SCREW		
G			N89-3008-46	BINDING HEAD TAPTITE SCREW		
H			N89-3014-46	BINDING HEAD TAPTITE SCREW		
DISPLAY UNIT (X25-3820-00)						
D9			B30-1263-05	LED		
C1			CE04KW1C330M	ELECTRO 33UF 16WV		
⚠ C2 -5			CK45FF1H103Z	CERAMIC 0.010UF Z		
CN1			E10-2703-05	FLAT CABLE CONNECTOR		
CN2			E10-1908-05	FLAT CABLE CONNECTOR		
CP1			R90-0852-05	MULTIPLE RESISTOR		
S1 -8			S40-1064-05	PUSH SWITCH		
D1 -8			HSS104A	DIODE		
D1 -8			1SS131	DIODE		
FL1		*	FIP9BFM8	FLUORESCENT INDICATOR TUBE		
IC1		*	UPD75216ACW-295	IC(MICROPROCESSOR)		
IC2			M51951ASL	IC(SYSTEM RESET)		
Q1 ,2			2SC1740S(Q,R)	TRANSISTOR		
Q1 ,2			2SC945(A)(Q,P)	TRANSISTOR		
Q3 -5			DTA124EN	DIGITAL TRANSISTOR		
A1			W02-0973-05	ELECTRIC CIRCUIT MODULE		
CONTROL CIRCUIT UNIT (X32-1500-22)						
C5			CE04KW1C330M	ELECTRO 33UF 16WV		
C6			CF92FV1H221J	MF 220PF J		
C7 -9			CE04KW1C330M	ELECTRO 33UF 16WV		
C10 ,11			CE04KW1C331M	ELECTRO 330UF 16WV		
C12 ,13			CF92FV1H363J	MF 0.036UF J		
C14 ,15			CF92FV1H821J	MF 820PF J		
C16			CF92FV1H752J	MF 7500PF J		
C18 ,19			CF92FV1H103J	MF 0.010UF J		
C20 ,21			CF92FV1H242J	MF 2400PF J		
C22 ,23			CF92FV1H561J	MF 560PF J		
C24 ,25			C90-1813-05	ELECTRO 22UF 50WV		
C28 -33			CF92FV1H471J	MF 470PF J		
C34 ,35			CF92FV1H221J	MF 220PF J		
C36 ,37			CE04KW1A101M	ELECTRO 100UF 10WV		
C38 ,39			CE04KW1C221M	ELECTRO 220UF 16WV		

E: Scandinavia & Europe K: USA P: Canada
U: PX(Far East, Hawaii) T: England M: Other Areas
UE: AAFES(Europe) X: Australia

⚠ indicates safety critical components.

DP-8020

PARTS LIST

* New Parts
Parts without **Parts No.** are not supplied.
Les articles non mentionnes dans le **Parts No.** ne sont pas fournis.
Teile ohne **Parts No.** werden nicht geliefert.

	Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格			Destination 仕向	Remarks 備考
	C40 ,41			CE04KW1H010M	ELECTRO	1.0UF	50WV		
	C42 ,43			CE04KW0J331M	ELECTRO	330UF	6.3WV		
	C44 ,45			CE04KW1C330M	ELECTRO	33UF	16WV		
	C46 ,47			CE04KW0J331M	ELECTRO	330UF	6.3WV		
	C48 ,49			CE04KW1A101M	ELECTRO	100UF	10WV		
	C50 ,51			CE04KW1C330M	ELECTRO	33UF	16WV		
	C52 ,53			CE04KW1A101M	ELECTRO	100UF	10WV		
	C54			CC45FSL1H101J	CERAMIC	100PF	J		
	C55			CK45FB1H332K	CERAMIC	3300PF	K		
⚠	C56 ,57			CK45FF1H103Z	CERAMIC	0.010UF	Z		
	C58			CF92FV1H124J	MF	0.12UF	J		
	C59 ,60			CK45FB1H222K	CERAMIC	2200PF	K		
	C61			CC45FUJ1H330J	CERAMIC	33PF	J		
	C62			CC45FUJ1H101J	CERAMIC	100PF	J		
	C63			CC45FUJ1H050C	CERAMIC	5.0PF	C		
	C66 -68			CE04KW1C330M	ELECTRO	33UF	16WV		
	C69 ,70			CC45FSL1H090D	CERAMIC	9.0PF	D		
	C71 ,72			CE04KW1H010M	ELECTRO	1.0UF	50WV		
⚠	C73			CK45FF1H103Z	CERAMIC	0.010UF	Z		
	C74			CF92FV1H104J	MF	0.10UF	J		
	C75			CE04KW1C330M	ELECTRO	33UF	16WV		
	C76			CE04KW1E330M	ELECTRO	33UF	25WV		
	C77			CE04KW1H010M	ELECTRO	1.0UF	50WV		
	C78 -80			CE04KW1C330M	ELECTRO	33UF	16WV		
⚠	C81			CK45FF1H103Z	CERAMIC	0.010UF	Z		
	C82 ,83			C90-1805-05	ELECTRO	330UF	25WV		
	C84			C91-0745-05	CERAMIC	100PF	K		
	C86 ,87		*	CF92FV1H271J	MF	270PF	J		
	C88 ,89			CF92FV1H222J	MF	2200PF	J		
	C90 -93			CF92FV1H272J	MF	2700PF	J		
⚠	C94			CK45FF1H103Z	CERAMIC	0.010UF	Z		
	C95			CE04KW1H010M	ELECTRO	1.0UF	50WV		
	C96			CE04KW1H010M	ELECTRO	1.0UF	50WV		
	C97			CF92FV1H103J	MF	0.010UF	J		
	C98		*	CE04KW1H2R2M	ELECTRO	2.2UF	50WV		
	C101,102			CE04KW1C330M	ELECTRO	33UF	16WV		
⚠	C103			CK45FF1H103Z	CERAMIC	0.010UF	Z		
	C104			CE04KW1HR47M	ELECTRO	0.47UF	50WV		
	C105			CE04KW1A101M	ELECTRO	100UF	10WV		
	C106			CF92FV1H103J	MF	0.010UF	J		
	C108-112			CE04KW1C330M	ELECTRO	33UF	16WV		
	C113			CC45FSL1H180J	CERAMIC	18PF	J		
	C114			CE04KW1A101M	ELECTRO	100UF	10WV		
	C115			CE04KW1C330M	ELECTRO	33UF	16WV		
	C116			C91-0668-05	CERAMIC	0.0047UF	K		
⚠	C117,118			CK45FF1H103Z	CERAMIC	0.010UF	Z		
	C119			CE04KW1C330M	ELECTRO	33UF	16WV		
	C120,121			CC45FSL1H150J	CERAMIC	15PF	J		
	C122			CF92FV1H333J	MF	0.033UF	J		
	C123			C90-1349-05	NP-ELEC	1UF	50WV		
	C124,125			CE04KW1C330M	ELECTRO	33UF	16WV		
	C126			C90-1350-05	NP-ELEC	2.2UF	50WV		
	C127			CF92FV1H223J	MF	0.022UF	J		
	C128			CF92FV1H152J	MF	1500PF	J		
	C129			CF92FV1H222J	MF	2200PF	J		

E: Scandinavia & Europe **K**: USA **P**: Canada
U: PX(Far East, Hawaii) **T**: England **M**: Other Areas
UE: AAFES(Europe) **X**: Australia

⚠ indicates safety critical components.

PARTS LIST

＊ New Parts
Parts without **Parts No.** are not supplied.
Les articles non mentionnes dans le **Parts No.** ne sont pas fournis.
Teile ohne **Parts No.** werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
C130			C91-0676-05	CERAMIC 0.01UF K		
C131			C91-0668-05	CERAMIC 0.0047UF K		
⚠ C132			CK45FF1H103Z	CERAMIC 0.010UF Z		
C133,134			CC45FSL1H101J	CERAMIC 100PF J		
C135			C90-1331-05	NP-ELEC 0.47UF 50WV		
⚠ C136			CK45FF1H103Z	CERAMIC 0.010UF Z		
C137,138			CF92FV1H822J	MF 8200PF J		
C139			C90-1331-05	NP-ELEC 0.47UF 50WV		
C140			CC45FSL1H470J	CERAMIC 47PF J		
C141			CE04KW1A101M	ELECTRO 100UF 10WV		
C142			C90-1349-05	NP-ELEC 1UF 50WV		
C143,144			CE04KW1C330M	ELECTRO 33UF 16WV		
C145			CF92FV1H124J	MF 0.12UF J		
C146			C90-1349-05	NP-ELEC 1UF 50WV		
C147			C90-1351-05	NP-ELEC 3.3UF 50WV		
C148			CF92FV1H104J	MF 0.10UF J		
C149			CK45FB1H821K	CERAMIC 820PF K		
C151			CC45FSL1H121J	CERAMIC 120PF J		
C152			CF92FV1H104J	MF 0.10UF J		
⚠ C153			CK45FF1H103Z	CERAMIC 0.010UF Z		
C154			CE04KW1J330M	ELECTRO 33UF 63WV		
C157			CE04KW1V100M	ELECTRO 10UF 35WV		
C160			C90-1350-05	NP-ELEC 2.2UF 50WV		
C164			CE04KW1E330M	ELECTRO 33UF 25WV		
C201-204			CF92FV1H103J	MF 0.010UF J		
C205,206			C90-1455-05	NP-ELEC 0.1UF 50WV		
C207,208			C90-1349-05	NP-ELEC 1UF 50WV		
C209-212			CE04KW1C330M	ELECTRO 33UF 16WV		
C213,214			C90-1456-05	NP-ELEC 0.22UF 50WV		
⚠ C301-303			C91-0971-05	FILM 0.01UF 250WV		
C304,305			CF92FV1H103J	MF 0.010UF J		
C306,307			CE04KW1E102M	ELECTRO 1000UF 25WV		
C308-311			CF92FV1H103J	MF 0.010UF J		
C312			CE04KW1C221M	ELECTRO 220UF 16WV		
C313			CE04KW1H470M	ELECTRO 47UF 50WV		
C314-317			CE04KW1A222M	ELECTRO 2200UF 10WV		
C318			CF92FV1H105J	MF 1.0UF J		
CN1			E10-2703-05	FLAT CABLE CONNECTOR		
CN2			E10-1907-05	FLAT CABLE CONNECTOR		
J203	1D		E11-0190-05	PHONE JACK(PHONES)		
J301	1E		E13-1404-05	PHONO JACK(4P)(LINE OUT)		
J302	1E		E11-0188-05	MINIATURE PHONE JACK(SYSTEM)		
L1 -3			L40-1011-17	SMALL FIXED INDUCTOR(100UH,K)		
L4			L32-0328-15	OSCILATING COIL		
L5 -8			L40-1011-17	SMALL FIXED INDUCTOR(100UH,K)		
L9 ,10			L40-3301-16	SMALL FIXED INDUCTOR(33UH,K)		
L11 ,12			L40-1011-17	SMALL FIXED INDUCTOR(100UH,K)		
L14			L40-1011-17	SMALL FIXED INDUCTOR(100UH,K)		
L101			L40-1001-17	SMALL FIXED INDUCTOR(10UH,K)		
⚠ L311			L79-0733-05	LINE FILTER		
X1			L77-1159-05	CRYSTAL RESONATOR		
R8 ,9			RD14AB2E220J	FL-PROOF RD 22 J 1/4W		
R13 ,14			RN14BK2C4220F	RN 422.0 F 1/6W		
R15 -18			RN14BK2C1001F	RN 1.00K F 1/6W		

E: Scandinavia & Europe **K**: USA **P**: Canada
U: PX(Far East, Hawaii) **T**: England **M**: Other Areas
UE: AAFES(Europe) **X**: Australia

⚠ indicates safety critical components.

DP-8020

PARTS LIST

＊ New Parts
Parts without **Parts No.** are not supplied.
Les articles non mentionnes dans le **Parts No.** ne sont pas fournis.
Teile ohne **Parts No.** werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
R19 ,20			RN14BK2C2371F	RN 2.37K F 1/6W		
R21 ,22			RN14BK2C1001F	RN 1.00K F 1/6W		
R29 -32			RN14BK2C1001F	RN 1.00K F 1/6W		
R33 ,34			RN14BK2C1003F	RN 100K F 1/6W		
R35 ,36			RN14BK2C10R0F	RN 10.0 F 1/6W		
R39 ,40			R92-0393-05	RD 3.0K J 1/2W		
R41 -46			RN14BK2C1963F	RN 196K F 1/6W		
R70			RN14BK2C1004F	RN 1.00M F 1/6W		
R75			RS14KB3A560J	FL-PROOF RS 56 J 1W		
R92			RS14KB3A101J	FL-PROOF RS 100 J 1W		
VR1 -6			R12-5070-05	TRIMMING POT.(MSB,2SB,3SB)		
VR101-103			R12-3126-05	TRIMMING POT.(10K/F,T GAIN)		
VR104			R12-3128-05	TRIMMING POT.(22K/TE,BAL)		
VR201	1D	＊	R29-9024-05	POTENTIOMETER(3KX2/0P LEVEL)		
K1			S51-2089-05	MAGNETIC RELAY		
⚠ S1	1E		S40-1103-05	PUSH SWITCH (POWER TYPE)		
⚠ S2			S31-2131-05	SLIDE SWITCH (POWER TYPE)	M	
D1 ,2			HZS8.2N(B)	ZENER DIODE		
D1 ,2			RD8.2ES(B)	ZENER DIODE		
D3 ,4			HZS4.7N(B)	ZENER DIODE		
D3 ,4			RD4.7ES(B)	ZENER DIODE		
D5 ,6			HZS13N(B2)	ZENER DIODE		
D5 ,6			RD13ES(B2)	ZENER DIODE		
D7			HZS5.6N(B2)	ZENER DIODE		
D7			RD5.6ES(B2)	ZENER DIODE		
D8			HSS104	DIODE		
D8			1SS133	DIODE		
D9			1SV147	VARISTOR		
D10 ,11			HZS11N(B2)	ZENER DIODE		
D10 ,11			RD11ES(B2)	ZENER DIODE		
D12 ,13			HZS5.1N(B2)	ZENER DIODE		
D12 ,13			RD5.1ES(B2)	ZENER DIODE		
D14 ,15			HZS5.6N(B2)	ZENER DIODE		
D14 ,15			RD5.6ES(B2)	ZENER DIODE		
D16 -19			HSS104	DIODE		
D16 -19			1SS133	DIODE		
D106			HZS5.6N(B2)	ZENER DIODE		
D106			RD5.6ES(B2)	ZENER DIODE		
D107			HSS104	DIODE		
D107			1SS133	DIODE		
D108			HZS30N(B)	ZENER DIODE		
D108			RD30ES(B)	ZENER DIODE		
D109			HZS7.5S(B)	ZENER DIODE		
D109			RD7.5JS(B)	ZENER DIODE		
D110-112			HZS4.7N(B)	ZENER DIODE		
D110-112			RD4.7ES(B)	ZENER DIODE		
D115-119			HSS104	DIODE		
D115-119			1SS133	DIODE		
D201-204			HSS104	DIODE		
D201-204			1SS133	DIODE		
D301-304			S5566B	DIODE		
D305			HSS104A	DIODE		
D305			1SS131	DIODE		
D306-310			S5566B	DIODE		

E: Scandinavia & Europe **K**: USA **P**: Canada
U: PX(Far East, Hawaii) **T**: England **M**: Other Areas
UE: AAFES(Europe) **X**: Australia

⚠ indicates safety critical components.

PARTS LIST

* New Parts
Parts without **Parts No.** are not supplied.
Les articles non mentionnes dans le **Parts No.** ne sont pas fournis.
Teile ohne **Parts No.** werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
IC1			NJM4565D	IC(OP AMP X2)		
IC2 -5			NJM5532D-D	IC(OP AMP X2)		
IC6 ,7			PCM1701P	IC		
IC8			NJM4565D	IC(OP AMP X2)		
IC9			SM5813AP	IC(8FS DIGITAL FILTER)		
IC10			TC74HCU04AP	IC(CMOS INVERTER)		
IC11		*	CXD1165Q	IC(DIGITAL SIGNAL PROCESSOR)		
IC12			NJM4565D	IC(OP AMP X2)		
IC13		*	KAG01	CUSTOM IC		
IC14			NJM4565D	IC(OP AMP X2)		
IC15			TC74HC00AP	IC(QUAD 2-INPUT NAND GATE)		
IC101			NJM4558D	IC(OP AMP X2)		
IC102			UPD4053BC	IC(3-INPUT 2CH MPX/DE-MPX)		
IC103			CXA1244S	IC(SERVO SIGNAL PROCESSOR)		
IC104			CXA1081S	IC(RF AMP)		
IC105			NJM4558D	IC(OP AMP X2)		
IC106			TC74HC00AP	IC(QUAD 2-INPUT NAND GATE)		
IC107			LA6500	IC(OP AMP)(5P/SIGNAL POWER)		
IC108			UPC4570C-A	IC(OP AMP X2)		
IC109,110			NJM4558D	IC(OP AMP X2)		
IC201			NJM4565D	IC(OP AMP X2)		
Q1			2SB941	TRANSISTOR		
Q2			2SD1266	TRANSISTOR		
Q3			DTC124EN	DIGITAL TRANSISTOR		
Q4			2SC1740S(Q,R)	TRANSISTOR		
Q4			2SC945(A)(Q,P)	TRANSISTOR		
Q5 ,6			2SC2878(B)	TRANSISTOR		
Q7 ,8			2SA1206	TRANSISTOR		
Q9 ,10			2SK246	FET		
Q11 ,12			2SK152	FET		
Q13 -16			2SC3940A	TRANSISTOR		
Q17			2SA1534A	TRANSISTOR		
Q18			2SC3940A	TRANSISTOR		
Q19			2SK246	FET		
Q20 ,21			2SA733(A)(Q,P)	TRANSISTOR		
Q20 ,21			2SA933S(Q,R)	TRANSISTOR		
Q22			DTA124EN	TRANSISTOR		
Q101			2SA1534A	TRANSISTOR		
Q102			2SC3940A	TRANSISTOR		
Q103			2SD1944	TRANSISTOR		
Q104,105			2SA1534A	TRANSISTOR		
Q106			2SC3940A	TRANSISTOR		
Q107			2SA1534A	TRANSISTOR		
Q108			2SC3940A	TRANSISTOR		
Q109			2SA1534A	TRANSISTOR		
Q110			2SC3940A	TRANSISTOR		
Q111			2SA1534A	TRANSISTOR		
Q112			2SC3940A	TRANSISTOR		
Q113			2SA1534A	TRANSISTOR		
Q114			2SC3940A	TRANSISTOR		
Q115			2SA1534A	TRANSISTOR		
Q116			2SC3940A	TRANSISTOR		
Q117			2SC1740S(Q,R)	TRANSISTOR		
Q117			2SC945(A)(Q,P)	TRANSISTOR		
Q118			2SA1534A	TRANSISTOR		

E: Scandinavia & Europe **K**: USA **P**: Canada
U: PX(Far East, Hawaii) **T**: England **M**: Other Areas
UE: AAFES(Europe) **X**: Australia

⚠ indicates safety critical components.

DP-8020

PARTS LIST

* New Parts
Parts without **Parts No.** are not supplied.
Les articles non mentionnes dans le **Parts No.** ne sont pas fournis.
Teile ohne **Parts No.** werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
Q119			2SC1740S(Q,R)	TRANSISTOR		
Q119			2SC945(A)(Q,P)	TRANSISTOR		
Q201,202			2SC3940A	TRANSISTOR		
Q203,204			2SA1534A	TRANSISTOR		
A1	1E		W02-1036-05	TRANSMITTING ASSY(OPTICAL)		
MECHANISM ASS'Y (X92-1320-02)						
11	2A,3B		B09-0088-04	CAP		
1	3A		D02-0085-04	TURNTABLE PLATTER		
2	1B		D10-2231-04	ARM ASSY		
3	1B		D10-2233-04	ROD		
4	2A		D10-2234-03	SLIDER (L,CLAMP)		
5	2B	*	D10-2235-13	SLIDER (R,CLAMP)		
6	1A	*	D10-2237-13	ARM		
7	3B		D10-2238-04	ROD		
8	3A,3B		D10-2270-04	ROD		
9	1B		D13-0725-04	GEAR		
10	1B		D13-0726-03	GEAR (MAIN)		
12	1B		D13-0743-04	WORM		
13	1B		D19-0253-24	WIRE (WITH SPRING)		
15	1B		D13-0744-04	GEAR		
16	2B		D15-0285-04	PULLEY		
17	2B		D15-0286-04	PULLEY		
18	2B		D15-0287-04	PULLEY		
19	2B		D15-0288-04	PULLEY		
20	1B		D15-0289-04	MOTOR PULLEY		
21	2B		D16-0192-04	BELT		
25	1B		D23-0237-04	RETAINER (TRAY)		
26	3B		D23-0238-05	RETAINER		
27	3B		D32-0177-04	STOPPER		
28	1A,1B		G11-1302-04	CUSHION (ROD)		
29	1B		G11-1321-14	CUSHION		
30	3A,3B		G11-1322-14	CUSHION		
31	3B		G01-2105-04	COMPRESSION SPRING		
32	1A		G01-2281-04	EXTENSION SPRING		
33	2A		G01-2282-04	COMPRESSION SPRING		
34	2B		G01-2283-04	COMPRESSION SPRING(BLACK)		
35	2A		J19-3119-04	HOLDER		
36	2A,2B		J02-0192-05	INSULATOR		
37	1A		J11-0137-03	CLAMPER		
38	3B		J19-2874-04	HOLDER (TURN TABLE)		
39	3B	*	J19-3058-15	HOLDER		
40	2B	*	J25-6316-15	PRINTED WIRING BOARD ASSY		
41	2A,2B		J42-0165-04	BUSHING		
42	3B		J91-0347-05	PICKUP		
43	1A	*	J99-0056-11	TRAY		
44	1A	*	J99-0071-04	TRAY ASSY		
-			J61-0019-05	WIRE BAND		
-			J61-0307-05	WIRE BAND		
45	2A	*	L90-0019-08	COIL		
46	3B	*	L90-0020-08	COIL		
51	1A,3B		N19-0891-04	FLAT WASHER		

E: Scandinavia & Europe K: USA P: Canada
U: PX(Far East, Hawaii) T: England M: Other Areas
UE: AAFES(Europe) X: Australia

⚠ indicates safety critical components.

PARTS LIST

* New Parts
Parts without **Parts No.** are not supplied.
Les articles non mentionnes dans le **Parts No.** ne sont pas fournis.
Teile ohne **Parts No.** werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
52	2A,2B		N19-0921-04	FLAT WASHER		
53	1A		N19-0945-04	FLAT WASHER		
55	2B		N19-1212-04	FLAT WASHER		
56	3B		N19-0143-04	FLAT WASHER		
57	1B		N19-1211-04	FLAT WASHER		
B		*	N09-2714-05	STEPPED SCREW		
R			N09-2593-05	TAPTITE SCREW		
S			N09-2591-05	TAPTITE SCREW		
U			N09-2675-05	TAPTITE SCREW		
V			N29-0067-05	PUSH RIVET (3.5X4.5)		
R1			RS14KB3A470J	FL-PROOF RS 47 J 1W		
61	1B,2B		S33-1017-05	LEVER SWITCH		
62	1B		T42-0485-04	MOTOR ASSY (CLAMP)		
64	1B		T42-0498-04	MOTOR ASSY (LOADING)		
65	3A		T42-0499-14	MOTOR ASSY (DISC)		
66	2A	*	T50-1049-05	YOKE ASSY		
67	3B	*	T50-1050-05	YOKE ASSY		
71	1A		T50-1041-04	YOKE		
72	1A		T99-0222-05	MAGNET		
M1	1B		T42-0439-05	DC MOTOR(CLAMP)		
M2	1B		T42-0486-05	DC MOTOR(LOADING)		
M3	3A		T42-0496-05	DC MOTOR(DISK)		
D1-3			S5566B	DIODE		

E: Scandinavia & Europe **K**: USA **P**: Canada
U: PX(Far East, Hawaii) **T**: England **M**: Other Areas
UE: AAFES(Europe) **X**: Australia

⚠ indicates safety critical components.

SPECIFICATIONS

[Format]

Type ..... Compact disc player
Read system ..... Non-contact optical pick-up
Rotational speed ..... About 200 to 500 rpm

[Audio]

Frequency response ..... 2 Hz ~ 20 kHz ±0.5 dB
Signal-to-noise ratio ..... more than 113 dB
Total harmonic distortion ..... 0.0013% at 1 kHz
Channel separation ..... more than 110 dB at 1 kHz
Wow & flutter ..... Below measurable limit

Output

LINE (FIXED) ..... 2.0 V
(VARIABLE) ..... 0 ~ 2.0 V
DIGITAL (OPTICAL) ..... −15 dBm ~ −21 dBm
Headphone jack ..... 20 mW (8 Ω)

[General]

Power consumption ..... 25 W
Dimensions ..... W: 440 mm
H: 132 mm
D: 381 mm
Weight ..... 10.1 kg

Note:
KENWOOD follow a policy of continuous advancements in development. For this reason specifications may be changed without notice.

Note :
Component and circuitry are subject to modification to insure best operation under differing local conditions. This manual is based on, the Other Areas (M) standard, and provides information on regional circuit modification through use of alternate schematic diagrams, and information on regional component variations through use of parts list.

KENWOOD CORPORATION
Shionogi Shibuya Building, 17-5, 2-chome Shibuya, Shibuya-ku, Tokyo 150, Japan

KENWOOD U.S.A. CORPORATION
2201 East Dominguez Street, Long Beach, CA 90810;
550 Clark Drive, Mount Olive, NJ 07828, U.S.A.

KENWOOD ELECTRONICS CANADA INC.
P.O. BOX 1075, 959 Gana Court, Mississauga, Ontario, Canada L4T 4C2

TRIO-KENWOOD U.K. LTD.
KENWOOD HOUSE, Dwight Road, Watford, Herts., WD1 8EB United Kingdom

KENWOOD ELECTRONICS BENELUX N.V.
Mechelsesteenweg 418 B-1930 Zaventem, Belgium

KENWOOD ELECTRONICS DEUTSCHLAND GMBH
Rembrücker-Str. 15, 6056 Heusenstamm, West Germany

TRIO-KENWOOD FRANCE S.A.
13 Boulevard Ney, 75018 Paris, France

KENWOOD LINEAR S.p.A.
20125, MILANO-VIA ARBE, 50, ITALY

KENWOOD ELECTRONICS AUSTRALIA PTY. LTD. (INCORPORATED IN N.S.W.)
4E Woodcock Place, Lane Cove, N.S.W. 2066, Australia

KENWOOD & LEE ELECTRONICS, LTD.
Wang Kee Building, 4th Floor, 34-37, Connaught Road, Central, Hong Kong